ETC.

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THE DISTORTION OF INFORMATION

JOHN R. KIRK *
GEORGE D. TALBOT *

IT HAS OCCURRED to us that distortion of information may be of three fundamentally different kinds. If so, it is likely that a technique curative of or prophylactic against one kind of distortion might not be appropriate for another kind. Yet, so long as the tripartite distinction that we suspect eludes the grasp of untutored intuition, an arsenal for combating distortions of information is likely to be ill-designed. In this paper we intend to discuss these three kinds of distortion in an informal way, and we offer names for these which, we hope, are mnemonic enough to commend themselves. We shall call them (1) systematic or stretch distortion—SD, (2) fog distortion—FD, and (3) mirage distortion—MD.

When we think of information we think almost automatically of books, newspapers, radio, and television—information in the conventional codes of natural language. The concepts we shall develop have a more general bearing. We are concerned with *transduction*—the transfer of information from one conducting medium to another, as from a violin string to the air, the air to the ear, or from the ear to the auditory cortex, and the anomalies that may arise in these transfers. To be sure, it is again a more complicated case of transduction when a newspaper reporter conveys information to his editor, and the editor to the printer, and the printed page to the ultimate purchaser of a newspaper, but of particular interest to us are those information transfers involved

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in *perception* and *conception*. These we picture as being operationally similar and lying at different ranges along a single continuum. The same three kinds of information-distortion which we believe to afflict perception we also believe to afflict conception. All three are rife, too, in interpersonal communications. But let us here exhibit for the reader a simple sample of each:

1. Astronomer Maskelyne fired his assistant, Kinnebrooke, because the latter was clearly incompetent. Charged with clocking upper transits of certain reference stars, Kinnebrooke consistently clocked them "late."

2. Philosopher Aristotle changed his mind because, this time, he bowed to empirical procedure. Convinced that all life comes from life, he tested this conviction through careful observation of a pond. The pond was new and fed from fresh rains, and Aristotle "saw" that it harbored no living thing. Yet, after a few days in the winds and under the sun, the pond was teeming. Life, concluded Aristotle, may generate spontaneously.

3. Prime Minister Chamberlain held out hope because he was used to the way that Englishmen honor their contracts. He was wooed by a wish, blinded by anxiety. Only a little *Lebensraum* in Czechoslovakia and the western front could keep it quiet. This, anyway, he "inferred" from Hitler's words. So, he promised "peace in our time" and made the Munich Pact and opened Poland to mass murder.

Each of these men availed himself of a sensory channel of communication. Each was victimized by a distortion of information. Even in ancient times, just such defects in the transmission of messages prompted Plato to repudiate the senses. As he put it: so long as we seek to learn what's what by consulting the channels of sense we are as prisoners in a cave, so shackled that we see on the cave's far wall only faint and flickering shadows of outer-world events. Plato was not a champion of "the extensional orientation," and his influence was such that two millennia passed before his theory of knowledge was swept into the backwash of scientific advance.

WHEN WE READ that we perceive the world "as through a glass, darkly" or "through the narrow slits of sense," we are mindful that Plato's cave-simile lives on; and when the Great Bookies of our time contend that all subsequent science and philosophy are a footnote to Plato, we concede a superficial sense in which they are right. But this footnote tells us that "the extensional orientation," while neither automatically nor even easily mastered, is ultimately rewarding. To attain it is first to do battle with the distortion of information. It is again to look upon the face of an enemy that intimidated Heraclitus.[1]

In drawing up our "intelligence estimate" of the "enemy capabilities" we recognize three groups of "combatants," three classes of "distortion." Against these we believe three somewhat different "battle strategies" may prove effective.

The astronomers, both Maskelyne and Kinnebrooke, paid a price for *systematic* or *stretch* distortion. Aristotle was alienated from the facts of life by *fog* distortion. A *mirage* fooled Mr. Chamberlain. We hope all this is not too obvious at the moment, or we would have little motive for moving on. And while no transfer of information may ever be entirely free from any one of these three effects, we shall, for ease of exposition, discuss them separately.

I. *Stretch Distortion*

THE ANAMORPHIC LENS used in photographing "cinemascope" motion pictures generates a simple case of systematic, or stretch, distortion (SD). The camera lens so stretches

[1] Early Greeks got mired in the sticky distinction between "appearance" and "reality." For Heraclitus, the unraveling of the two was so difficult that he gave up before he began; he announced, sadly, that "all things change." Parmenides was so shocked when he examined the world that he closed his eyes and announced that "nothing changes." Plato sought a synthesis of these seemingly contrary positions and proposed "reason" as that faculty which would enable us to discover "reality" with our eyes closed. Since "reason" had enjoyed considerable success in geometry, Plato pinned the "reality" label on airy mathematical constructs which, in themselves, deal us neither pain nor pleasure. Mere bodily being is then termed "appearance"; thus, in the Platonic-Augustinian-Pauline tradition, one combats appearance (the distortion of information) through mortification of the flesh. We shall propose alternatives that allow for more fun.

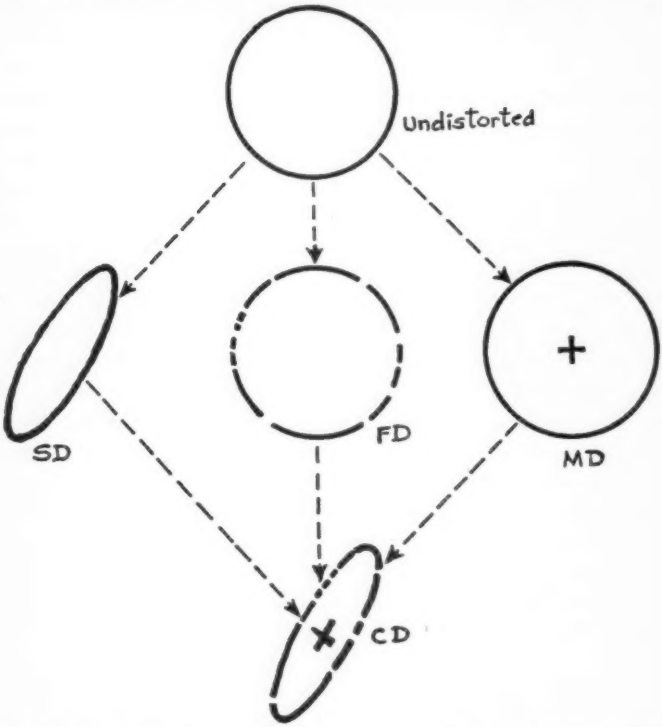

Diagram shows different kinds of distortion afflicting a circle. SD is *systematic* or *stretch* distortion; no information is lost; it is simply "recoded." FD is *fog* distortion; information is lost. MD is *mirage* distortion; spurious information is added. In CD (combined distortions) we see the effect of all three species of distortion.

the image that, on the film, everything looks oddly tall and thin, somewhat Modiglianish. Significantly, if we now project this "distorted" image through the same lens, the image will be fattened enough to assume "proper" proportions. In SD no information is lost. Rather, it is changed or recoded in an orderly or systematic way. Distortions of this kind are like the distortions a rubber sheet might undergo, so long as it is not torn. Thus, SD can be eliminated or "corrected for" by

the application of a rule specifying the appropriate "topological transformation." We all know a number of simple rules of this sort. A man who *always* tells lies gives his listeners no trouble. They realize that he speaks a different language. And they soon learn a simple and reliable rule of translation: attach "not" to his main verbs. They thereby convert the liar into an oracle.

Sometimes SD is useful even when it goes "uncorrected." Some auto rear-view mirrors are cylindrically convex so that the driver may scan at a glance far more than a "flat-mirror-glimpse" of the territory behind him. Again, he sees images which are tall and thin, and they require "getting used to." As a communication channel, the cylindrical mirror's capacity for conveying optical information may be commensurate with that of the flat mirror. Still, for the *purpose* of safe driving, the "distorting" mirror may prove more valuable; its image is a map of familiar territory but with unusual "projection" for a special purpose. Once it is "got used to" it packs a greater amount of *telically pertinent* information. Similarly, the concave shaving mirror "distorts" for a purpose. That it "distorts" is eloquently testified by the scarred face of the man who has been using it for only a short time.

The reader will have realized that "getting used to" SD has operational consequences similar to "correcting for" it, and this re-education involves more than mere long-suffering exposure. The atonality of Stravinsky's most recent output or the perversity of Picasso's *Guernica* are not "got used to" until one first gets an inkling of the purposes these "devices" are intended to serve. Once one appreciates the purposes, and that they are well-served, the "devices" cease to seem artificial —they become a part of the natural "undistorted" language.

We must conclude that whether a message is appraised as distorted or undistorted will depend upon the purposes to which we relate it. This is to say that *the "distortion" concept applies in a precise way only to pertinent information, and the latter should always be goal-indexed.* What is automatically judged "undistorted" is what automatically serves our purposes. As pornography, Duchamp's *Nude Descending the*

Staircase is quite hopelessly "distorted." Likewise, a map may fail as an object of art, may grievously violate the prevailing esthetic canons and yet lead to reliable predictions and so be, as indexed to the latter goal, "undistorted." Conversely, even a "representational" landscape may wound a cartographer's sensibility; and the move of modernist painters in various "non-representational" directions reminds us not to confuse cognitive with esthetic aims, though often these may be synergic.

SOMETIMES SD is entertaining, as when we find ourselves amidst carnival fun-house mirrors or when we try translating into more robust idiom the characteristically tepid language of the diplomat. When we hear a phonograph record with a consistent "wow" or watch a movie in Near-Color we find SD annoying. Sometimes SD actively interferes with our knowledge-gathering as we try to recognize the face of a friend in a photographic negative or read, in the subway, the upside-down headlines of somebody else's newspaper. In music, SD often heightens esthetic interest: Rachmaninoff inverts a theme of Paganini and produces, thereby, the melody of a popular song; Saint-Saëns selects Offenbach's break-neck "Can Can," puts it in molasses-like slow-motion in his *Carnival of the Animals,* and calls it "Tortoises."

Whether comic, cloying, or charming, these effects can persist even when we *know* the rule for recoding or "correcting" the message; *these* effects, though lightly seasoned with our conceptualizing, are primarily *perceptual* in character, and the transactional psychologists have demonstrated that perceptual "learning" has a life almost its own and pays little heed to our most enlightened cerebrations *about* perception.[2]

This *polarizing* of the perception-conception continuum may account, also, for the conjugate phenomenon: the table across the room "looks" square, but chances are we have never

[2] See F. P. Kilpatrick, "Perception Theory and General Semantics," and Hans H. Toch, "How Are Data Interpreted? A Transactional View," in *ETC.,* XII (1955), 257-264, 309-314.

observed the table under conditions where our perceptory apparatus was not required to "correct for" viewing angle. Joe drops in with last summer's color slides. We find them breathtakingly real. Yet, a laboratory analysis might disclose large distortions in hue. The story is much the same in acoustic experience. Pre-set the drawbars of a Hammond organ so that only high harmonics sound, neither fundamentals nor any of their octaves taking part. Then, play a melody. Your auditory equipment will inject the missing fundamental in each note of the melody (the effect, in this case, is due not to perceptual "learning" but to the vibration characteristics of our asymmetrical ear drums). Our perceptory apparatus has built-in servo-mechanisms which, within limits, often "correct for" mild cases of SD in much the manner of automatic "shaders" in the television control room. But in thus "correcting for" SD, our perceptory apparatus applies "rules of recoding" whether we know about them or not. Though we ordinarily use the word "know" and its cognates in exclusive association with the conceptual pole of our experience, it is clear that our perceptory apparatus, too, can "know" in its own way, at least sometimes, and with moderately independent notions of "truth" and "error."

Failure to appreciate the "correctibility" of SD has resulted in strange absolutisms. We laugh at the traveler who, in a foreign country, is surprised to find it populated with "foreigners." But in otherwise respectable texts we have seen it asserted that the human eye "sees" things upside-down but that the brain, through some "marvelously mysterious mechanism," sets the image right-side-up again! (We are not here alluding to the topographic projection of retinal impulses on the visual cortex—*that* is both marvelous and mysterious.) We grant that, even for an infant, the world takes a heap of "getting used to," but experiment shows it takes no more if the infant is outfitted at sufficiently early age with glasses which vertically skew the visual pattern by 180° from what the rest of us recognize as "normal." The infant couldn't care less, unless and until a meddler subsequently decides to give him "proper" spectacles. In contrast, the early apprecia-

tion of the "correctibility" of SD would lead one, as it did Korzybski and Russell, to the realization that *knowing* is a knowing of space-time structures rather than an acquaintance with intrinsic qualities.[3]

IN THE LANGUAGE of the laboratory, SD is called "determinate error," and the label suggests that lab technicians have ways of dealing with the difficulty. Suppose that some event is recorded through several communication channels and that at no two of these are the output patterns of information "the same." If a "rule of recoding" can be applied to the information collected at one receiver so that the result "agrees" faithfully with the information collected at another receiver, then we say that SD *exists between* these channels. No sleep is lost over which of these supplies the "undistorted" or "true" picture and which the "aberrant." The lab technician chooses one channel as basic and calibrates the other systems in the language of the chosen system. The choice, of course, is not utterly arbitrary. It may be made on the basis of ease of understanding, on technical manipulability, or other species of convenience. The choice is calculated to maximize the pertinent information.

In natural language SD exists between such statements as "Tom is taller than Bill" and "Bill is shorter than Tom"; here, the "rule of recoding" is a simple rule of relational logic. Grantedly, the SD here is small. Most of us would say that these statements are two different maps of the same territory and that it is a matter of no consequence which one we use. Since we have "got used to" reading each kind of map we do

[3] "Since Einstein and the newer quantum mechanics, it has become increasingly evident that the only content of 'knowing' is of *structural character.*" Alfred Korzybski, *Science and Sanity,* 4th ed., (Lakeville, Conn., 1958), p. 60. "There are, in nature, innumerable examples of complex structures transmitted causally throughout changes of intrinsic quality, such as those between sound and electromagnetic waves in broadcasting. . . . People unaccustomed to modern logic find it difficult to suppose that we can know about a space-time structure without knowing the qualities that compose it." Bertrand Russell, "Non-demonstrative Inference," *The Centennial Review of Arts and Science,* III (1959), 246-247.

not find one a "distortion" of the other. The creative writer may be sensitive to the fact that for some readers, these two maps carry a slightly different emotional freight. If the writer wants Tom to be the target of empathy and admiration, he will use the first statement; the second would appear a slight "distortion" of his intent. If he wants initial sympathy bestowed on Bill, he will choose the second statement; the first would then prove a bit "distortive."

There is an approximate logical equivalence, too, between such remarks as "When I gaze into your eyes time stops" and "Your face would stop a clock," but here no special talent is required to determine which version is apt to be the more successful communication. The last example clarifies the fact that messages in SD with each other by virtue of one "rule of recoding" (a logical rule, say) may not be in SD with reference to another rule (here, a psychological one), for various rules are justified with respect to purposes which may be disparate. The "distortive" aspect of SD reflects implicit and often unconscious use of an inappropriate "rule of recoding."

Again, rules of logic establish SD between "If there is no radiation in the neighborhood, the Geiger counter will not click," "Either the Geiger counter will not click or there is radiation in the neighborhood," and "Unless there is radiation in the neighborhood, the Geiger counter will not click." We have found that "distortion" between these statements is alarmingly large; they are often not recognized as "saying the same thing." Among different readers, tests show a startling lack of consensus about the ways in which any one of such statements can be legitimately "transformed." When the truth-functional connectives which strew technical orders and instructions are so disparately understood, it is small wonder to us that new-built buildings crumble, bridges break, and rockets refuse to leave their launching pads. A practical prophylaxis against this type of communication collapse is, in part, increased acquaintance with modern logic. Logic, as a discipline, can be helpfully construed as training in the preparation and interpretation of several different types of projection

of natural language maps of any possible territory, the "projections" being chosen with cognitive and technological purposes in mind. Logic's pay-off in the language classroom, particularly at the undergraduate level, is primarily the preservation of syntactical flexibility, even its encouragement, while eliminating the "distortion" of information engendered by mere syntactical anarchy. It is a means for partly "calibrating" the members of a linguistic community so that they can communicate and work together creatively rather than at cross purposes.

A PHYSICAL LAW may "recode" a natural language map. Logic is insufficient to establish SD between "The freight car has a gravitational mass of ten tons" and "The freight car has an inertial mass of ten tons." Yet, Einstein was able to draft a rule (the "principle of equivalence") which faithfully transforms statements of the first sort into those of the second without change in truth-value. More precisely, on the basis of the suspicious but "unaccountable" fact that the gravitational and inertial masses of a body are always proportional, Einstein "accounted" for the "unaccountable" by treating any statement about accelerated motion as in SD with some statement about gravitation and *vice versa*. This suggested the making of some maps which nobody had got around to making before. In these, light underwent deflection in gravitative fields—a phenomenon which obligingly cropped up in the territory of the solar eclipse of March 29, 1919, and in all subsequent ones.

Which reminds us: during the last four centuries much philosophic heat was engendered and some human flesh burned over rival geocentric and heliocentric maps of the universe. True, the detailed difference between the classic Ptolemaic and Copernican models was *not* an *exact* specimen of SD. Ptolemy could not have accounted for the phases of Venus, for example. Copernicus could have, if he had known about them. But all the froth, and what did Bruno in, was no such matter of detail. It *was* the much "bigger" matter of whether Earth is motionless and at the center of the universe (as befits

God's "footstool") or whether the Sun is. This tremendous issue General Relativity shows to be one arising from SD and, thus, no issue at all. We know now that for every geocentric map there is a cognitively equivalent heliocentric map, and *vice versa*.[4] The difference is one of code, not of content—at least, not of cognitive content.

WE HOPE that some of the disagreement and animosity which divide the East and West might be in some significant measure dissipated through a similar "adjustment." We do not claim that the differences between the Soviet Union's point of view and that, say, of the United States are wholly or even primarily resolvable as cases of SD, but we do suspect that enough of the cultural and ideological "centrisms" reflected in such verbal talismans as *democratic, planned, idealistic, radical, free, reactionary, socialistic, classless,* etc., would, on analysis, exhibit SD, and that such analysis might be worth a good deal of scholarly effort.

In his book, *The Anatomy of Peace* (New York and London: Harper, 1945), Emory Reves wrote a chapter, "A Copernican World," which sketches history between World Wars I and II as it appeared, "centrically," to each of the several major contenders, a sort of Hayakawan "slanting several ways at once." Something like this is a necessary preliminary to SD analysis in the area of international relations. We now need more spadework of this sort, and in greater detail.

This should be followed, we think, by a team attempt at SD "resolutions." Members of the team should represent a variety of interested nations and be specially equipped for their task through training in linguistics, logic, semantics, psychology, and cultural anthropology. We would recommend, moreover, that topologists have a place on such a team, for their

[4] Hans Reichenbach's theory of "equivalent descriptions" is the first broad contribution to *SD* analysis. For detailed expositions of this theory in its applications to problems of physics see his *The Philosophy of Space and Time* (New York: Dover, 1958) and *Philosophic Foundations of Quantum Mechanics* (Berkeley and Los Angeles: University of California Press, 1944).

branch of mathematics is germane, and physicists, for they, above all others, can testify to the fruits of SD analysis.

WHAT WE HERE PROPOSE, we realize, may seem an ivory-towered pipe-dream. But we should like to point out that while most plans for reducing international tensions presuppose a modicum of "good faith" on all sides, what we envision does not—or, at least, no more than that which graces any world conference on scientific matters. If disguised SD in the language of politics and social polemic actively contributes to "bad faith," a concerted detection and exhibition of it might lead to increments of "good faith." The strategy for detecting and resolving SD is simple *in principle*. In practice, an Einstein may be required to carry it off, and in social theory it can be doubted whether the world has yet seen its Einstein. In matters of less moment and magnitude, happily, we can often turn a tiny Einsteinian trick. A friend of ours always says "fair" when he means "excellent," "poor" when he means "fair," and "ghastly" when he means "a bit under par." By now, most of his friends have "calibrated" him. They "have his number." So they remain his friends.

But in 1796, at the Greenwich Observatory, where Maskelyne and Kinnebrooke were functioning as two channels between which there existed SD, a rule of recoding was not applied. It was not even known. It was discovered eventually, by Bessel, another astronomer. Today it is known as "the personal equation" and takes due cognizance of reaction times. Kinnebrooke, it turns out, was quite as accurate as Maskelyne. But the two gentlemen were slightly "out of phase," and Maskelyne was boss.

II. *Fog Distortion*

FOG DISTORTION (FD) is easier to describe, less easy to dispel. In FD, information is lost, masked out, "fogged" over, because of the inability of the transducer to respond to the smallest or largest differences in the input. A snapshot of a pastoral scene will show neither the bacteria on a bush nor the full brilliance of the sun. Germs are details too fine

for the resolving power of the lens and the coarseness of the film grain; the ordinary light of the sun is far too bright for a film to record along with all the other contrasts. Low FD is what hi-fi is all about. The crisp transient response, the span of all audible frequencies, the full dynamic range in volume—these are some of the ways in which hi-fi is high.

If everybody's hearing or seeing or sensing were equally impaired, would we know it? In one sense not, and what we did not know would not "hurt" us, would not cause the feeling of frustration at missing what others get. None of our acquaintance bemoans his inability to see radio waves, for here everyone's impairment is complete.

But in another less subjective sense we *do* sometimes know what it is that we miss. We know, for example, that our unaided eyes cannot see viruses. Danger may lurk in things unsensed. And in the last movement of his last symphony Tschaikowsky writes for stereo sound, though no stereo recording that we know of has as yet exploited the fact.[5] In the unsensed, unsuspected beauties may reside. Thus there are both cognitive and esthetic reasons why we should be interested in being able to reduce FD. We can be frustrated even when we lack the feeling of frustration.

It should not be concluded, however, that FD is always bad. As we shall see, a moderate amount of FD has been helpful, at times, to science. And an artist may choose to reduce his "alphabet," may want us to focus our attention on a smaller-than-usual amount of pertinent information, and may, thus, "fog" the rest. Nor should it be inferred from the above examples that FD afflicts only micro-details. Perhaps you remember the cartoon. An anthropologist has pitched his tent, unknowingly, in the center of a huge footprint. He then remarks to a colleague, "You know, there's a superstition among the natives that a giant monster inhabits this place."

[5] See the score (Symphony No. 6 in B Minor). In the exposition of the *adagio lamentoso*, odd-numbered notes of the melody are carried by the second violins, even-numbered notes by the first violins; in the recapitulation this distinction is no longer maintained. Perhaps we have tin ears, but we have never been able to *hear* the difference. Stereo seating and engineering should correct that.

FD thus works at the other end of the magnitude scale. The astronomer's inability to tell at a glance whether distant galaxies are distributed randomly through space, and the social scientist's processing of a plethora of data to verify a "fact" already recognized by less tutored laymen, are more serious cases in point.

IN THE LABORATORY, FD raises its fuzzy head as *random error,* and technicians find it not possible to "correct for" FD in any straight-forward way—what has been lost is lost. Yet, there are some strategies for dealing with the loss. First, we can make inferences to fill the "holes" in our data. Given a part of a dinosaur skeleton, the paleontologist "reconstructs" through inductive techniques what time and decay have "fogged." The cosmographer, using the data of the Hale Telescope on Palomar Mountain, supplemented by that of vaster and more recent radio telescopes, assumes he has studied a statistically fair sample of the universe-at-large; he then deduces the shape and size of space-time. Even our own perceptory apparatus stops up "holes" in much the same way. The eye does not "see" what falls on that spot of the retina where the optic nerve is attached, but into this "blind spot" is interpolated the hue and texture of the surrounding image. We know that such interpolation is sometimes "false"—inductive inferences can "go wrong."

A second and more direct strategy for dealing with loss is the technological improvement in our methods for recording events. Lenses can be made "sharper" and "brighter," loudspeakers more powerful and sensitive, cyclotrons more penetrating, words more precise, and pigments purer.

Diction, too, is hurt by "fog." As language evolves, many words lose their earlier univocality and precision, and as vagueness proves *sometimes* convenient, many people pursue it finally as an end-in-itself. Distinctions get lost—for example, the earlier "nice" one between "smell" and "stink," or the more recent and not-quite-so-nice one between "hep" and "hip." And, once, we had a reasonably clear notion of what *aggression* was. To be sure, as the special sciences and trades

coin new and well-defined technical terms, this "degradation" of language is balanced by a countertendency. But FD infiltrates language and our conceptualizing in still more subtle ways. Because of FD we not only do not see the trees for the forest but, often, cannot see the forest for the trees. We need the cross-classification concepts encouraged by non-aristotelian semantics; these relate "in the large" many things which would otherwise seem distant and disconnected. We require "reducing glasses" just as much as "magnifying glasses." In the interests of a better science of man, perhaps we need the former even more.

According to an old saying, "The wisdom of the age is sufficient unto the needs thereof." Thus, Newtonian mechanics was sufficient unto the needs of those whose FD was no less than that prevailing in 1850. The theories suggested by data distorted by a particular level of FD are likely to be tested by data at a roughly similar level, if the suggesting and testing occur in one and the same period of technological development. So, for a theory to be valuable, its predictive content need only be slightly more distorted than were the original suggestive data.

In pushing forward the frontiers of firm knowledge, our observational (i.e., perceptual, plus recording systems in SD) and conceptual apparatus should be yoked, at least loosely, in a symbiotic relationship. Too sudden an advance in our techniques for dispersing "fog" is apt to disclose a lag in our conceptualizing, and the shock of this disclosure may sometimes retard the growth of theory. At the present time, for example, physicists are still reeling from the downfall of parity in weak interactions.

III. *Mirage Distortion*

IN MIRAGE DISTORTION (MD) we see something that "isn't there." Far from withholding information from us, MD gives us extra, unwanted information. That is, it *should* be unwanted. But we concede that there are many people who desire the "mirages" with which they are afflicted. It *should* be unwanted because it is likely to be construed *mistakenly*

as pertinent information, thus introducing error into predictions. On a television variety show we may see "snow" drifting down over the dancing girls, and we may mistake an electromagnetic disturbance for the big budget.

Note that MD typically involves FD also, for the "false" or "impertinent" information replaces, blots out, "fogs" the "true" or "pertinent" information. The prototype of MD is the classical mirage itself. But it should not be thought that MD is limited to the visual or, even, the perceptual. We can also *conceive* "something" that "isn't there"—we can spin false theories. Often the false theories that we spin are outcomes of MD which has been "transferred" along the perception-conception continuum from the former pole to the latter.

It is instructive to understand how mirages (literal ones) delayed man's acceptance of the roundness of his home planet. The size and shape of Earth were estimated by Eratosthenes in the second century B.C. He came within fifty miles of the correct circumference! Two hundred years earlier, Empedocles hit upon the right explanation of lunar eclipses and, there witnessing the curvature of Earth's shadow, must have guessed Earth's shape. And people of ages past, living near seaports, are used to the way that ships, outward bound, disappear hull first and mast last. Yet, as late as the sixteenth century there were scholars who held out for Earth's flatness. That "seeing is believing" is a peculiarly modern wisp of "commonsense." Its analog in ancient times, as attested by Thomas the Doubter, was to the effect that "touching is believing." Once the hot and arid areas of Earth were opened to exploration, desert travelers were tantalized by clear but distant pools which, upon closer scrutiny, vanished. This gave point to the teaching that *whatever is seen at a distance is not to be entirely trusted.* And since all the ancient evidence for Earth's curvature involved such "distant vision," it was automatically suspect.

In the raw perceptions of everyday life little MD occurs. Our perceptual apparatus is genetically "designed" to filter out MD which would be apt to occur at threshold intensities. The retina of the human eye, for example, is theoretically

sensitive enough to record even one quantum of visible light, but some neurological "fair sampler" intervenes so that something like six or seven quanta are absorbed before a neural impulse winds its way to the visual cortex. There is a similar loudness threshold. Were the human ear any more sensitive than it is, it would register the "white noise" of the Brownian movement of colloidal particles in the liquids of the semicircular canals. Evolution has "ordained" that anything sensible worth attending to can afford payments of certain threshold numbers of action-quanta.

Evolution is not omniscient, however, hence human beings are interested in lowering the levels, here and there, of FD. Nor is evolution omnipotent, hence some MD gets through the genetic barriers. In even quite "normal" people the nervous system will present, now and then, minor "mirages." We will "hear" a noise or word, "see" a flash of light, "feel" a fall, uncoordinated with anything in the "outside" world. Certain drugs will amplify these "mirages" into sustained hallucinations.

The world of the mentally ill is filled with MD at various ranges of the perception-conception continuum—even without benefit of drugs; the psychotherapist might do well to investigate the principles governing the distortion of information. Much of Sigmund Freud's psychoanalytic theory, for example, can be thought of as the formulation of "rules of recoding" for exhibiting SD between minor MD in infantile experience and somehow amplified MD in adult experience, conceptualizing, and evaluation.

THE WAY to combat MD is to understand its source, its cause. Once the meteorology and optics of mirages were understood, mirages no longer mystified. The new knowledge even made them predictable to a degree, and hence largely ignorable. If we know a little about the physics of radio broadcasting and hear static on the amplitude-modulated signal, we know better than to "refer" this to the activities of the studio sound-effects man; if, on the other hand, we encounter crackles and pops on a frequency-modulated broadcast, we may conclude that we have caught a cereal commercial.

Understanding, of this depth and sophistication, is a powerful thing. It can make short shrift of MD.

Unfortunately, the discovery of general principles is hard work. It requires the construction of complex explanatory inductions. Most of us are too lazy for that; thus we deal with MD by making simple statistical-inductions-by-enumeration. We allow ourselves, thereby, to be "taken in" by MD for awhile. Gradually we begin to recognize and classify that information which has been persistently misleading and so learn to ignore it. Such crude "classification" we then think of as an "explanation." We once tried to interest a little boy in the physical theory underlying radio. "Why," we asked him, "does that little box with the knobs on it give forth music and words? How is such magic possible?" The little boy looked searchingly at us to see whether we were sick and replied, "Because it's a radio, stupid!" The ancients, too, "got used to" their desert mirages, and were then less misled by them, and so had decreasing interest in studying and explaining them.

Most of us are "lazy" in this way, and our modern eyes and ears "freeze" or "crystalize" the results of this "laziness" in our everyday perceptions. Our devices for filtering MD from our perceptions operate by Korzybskian *signal-reactions*. The neurological hook-ups are relatively inflexible, fixed, "frozen." It is for this reason that the transactional psychologists have been able to play upon our signal-reactions and "conjure up" MD at the level of raw perception; thus, the "trapezoidal window" persists in its "oscillation" even when we "know" it is rotating.

When, in our conceptualizing, we take the easy statistical-inductions-by-enumeration road, we are making our cerebral cortices mimic the signal reaction patterns of our basic perceptual equipment. Thus, you hear people say that no war will ever destroy humanity because no war ever has! Korzybski has foretold the foolishness of this sort of extrapolation. While signal reactions at the perceptual pole of the continuum filter all but a little MD from our experience, signal reactions in the conceptual range engender and amplify MD.

IN THE preceding section we remarked that one of the strategies for dealing with FD is the making of inductive inferences to fill "holes" in our data. But any inductive inference *can* go wrong. The going wrong of *these* "interpolative" or "extrapolative" inductions is the primary source of the most troublesome MD. The inductions which led to "the phlogiston theory" of combustion, or to "the ether theory" of the propagation of light, "explained" the immediate observations but put out "false" leads to delay men in their comprehension of nature. For millennia after Aristotle made his fateful decision concerning the spontaneous generation of living things, experiments were conducted which substantiated Aristotle's claim. Thus, FD may lead to MD which may lead, in a widening feed-back oscillation, again to FD, etc. This awful possibility justifies priority reduction of FD even at the expense of temporary inconvenience to our pet conceptual schemes.

Scientists know "mirages" as *artifacts*. The object of experimental study is some signal-source, but extra signals spawned in the channel between source and receiver are likely mistakenly to be "referred" to the source. (Amputees sometimes complain that a toe on their missing foot aches. Physicians term this "referred pain.") Such extra signals are artifacts, MD. In teletype circuits, in telegraphy, in electronic computers, and in the translation of ancient documents, MD is not negligibly rare, but the built-in redundance of such source messages makes the "mirages" easier to spot. When scientists speak half-mystically of "the uniformity of nature" they express a hope that messages from signal-sources in nature-at-large will have an obligingly similar redundance. To be prepared for a possible dashing of such hopes, some philosophers of science have recently been able to give their blessings to statistical techniques *which presuppose no redundance in nature-at-large*.[6] We look to these as man's best means for ridding the cognitive enterprise of MD.

[6] Whether this is possible has been extensively debated since Hume's time. For a discussion of the justification of inductive procedures and its significance for a humanist outlook in everyday living, see John R. Kirk, "Science and Faith," *The Centennial Review of Arts and Sciences*, III (1959), 51-78.

The neurological and biochemical correlates of the emotions are not yet well-understood. But it has long been folk wisdom that sentiments and emotions can "slant" a person's thinking. This, too, is MD. Within the last decade psychologists have learned that strong wants, strong inhibitions, and strong fears and anxieties can distort even a person's raw perceptions. It has been recognized for centuries, however, that such emotions may invade even the relatively flexible and enlightened area of *symbol-responses* and influence our conceptions and predictions. People so prone were characterized by William James as "tender-minded."

THIS emotional source of MD, a common one in everyday life, may be called "obliquity." *Obliquity* is a disease of optimists, pessimists, and manic-depressives. It is the tendency to construe the desirability or undesirability of some state-of-affairs *as evidence* of the existence of that state-of-affairs. An optimist, like the late Mr. Chamberlain, chronically puts his trust in desirability. The pessimist is convinced that the undesirable is more likely to happen. The manic-depressive vacillates wildly from one extreme to the other. Our myriad slight obliquities, of which we are largely unconscious, are what make such famous projective tests as the Thematic Apperception Test and the Rorschach work as well as they do. They may serve to alleviate the *feeling* of frustration and so enhance our *subjective* security. But in the context of accurate prediction and searching explanation, obliquities are toxic and can gnaw away, like termites, at the foundation of our *objective* security. For, except in special cases (like Merton's self-fulfilling or self-defeating prophecies), what we *wish* to be true, or *fear* might be true, manages to exist quite independently of our sentiments about the matter. Under the influence of obliquity, we approach the truth, calculate the future, at best *obliquely*, and at the cost of some delay. And the cost may be prohibitive. Mr. Chamberlain lies under stone in a small and shadowed section of Westminster Abbey. His obliquity made many other graves, marked not nearly so well.

To be immune to obliquity is to be "tough-minded"—

again, the phrase is William James's. It is to walk the straight-and-narrow between the Scylla of optimism and the Charybdis of pessimism. But as this species of MD (obliquity) has long been recognized by men everywhere, why has it not been more effectively dealt with and "corrected?"

HERE, we believe, the situation is again one of *over-correction*. It is a social myth that scientists, to be any good, must be cold as cucumbers. That would rid them of obliquity, all right. But it would also make them quite incapable of doing any science. Any science, for the scientist therein engaged, is a warm and passionate affair. Obliquity is but *one* of several ways in which values operate in inquiry. It is, to our knowledge, the *only* one which *distorts* input information. Others, we believe, are essential to science.

Yet, the press and the public glorify the physicist who can speak coolly of several hundred thousand surviving Americans digging themselves out of H-bomb devastation while their leaders press the buttons to retaliate in kind. And what of the geneticists and biochemists who are trying to arouse the public to the dangers of radiation? Why, their sentiments are unseemly in scientists, and to be suffered in somewhat embarrassed silence! Nor do we deem it a dishonor to a distinguished and once influential physicist that he felt Americans might do wiser things, at the time, than develop the hydrogen bomb—especially since he may have been right. To be "tough-minded" is not, in our view, to lack a heart.

To the extent that the words and other symbols people use are valuative, packed with "emotive" meanings, triggering *signal* approvals and disapprovals, there is danger that "subsurface" obliquities will be reinforced or congealed thereby. In the literature of general semantics, we find S. I. Hayakawa's warnings against "snarl-words" and "purr-words" in reportive (cognitive) contexts. If we understand him, his intention is not that we abandon our values or even our passions. And he is surely not against the making of better and better value-judgments. Rather, his worry, and ours, is lest we allow our values or passions to distort our maps of what's what—that

our emotions may generate MD. And—if we may conclude with a value-judgment of our own—what's what *ought* to determine, or at least influence, what we value or whom we have a passion for.

LITTLE has been said so far concerning the dynamic relationships among our three fundamental species of the distortion of information. It seems to us that there is much work here to be done, and preferably within a rigorous mathematical framework, that perhaps of information theory. MD is what the information theorist or communication engineer calls "noise" in *typical* applications of the theory. Are the phenomena of SD and FD derivable as entities distinct from "noise" in information theory? We are uncertain of the answer here. Perhaps an *atypical* application of the theory would permit the concept "noise" to embrace all three of our species of distortion. Perhaps, too, these alternatives are not mutually exclusive. Each may be possible.

Our purpose has been to enlist the interest and talents of those involved in communication, in international relations, in psychotherapy, and in the social sciences, in the hope that something we have said here will suggest new lines of thought and new experiments.

The epistemologist may note that the ancient and honorable dualism between "appearance" and "reality" was dissolved, in our treatment, into "degrees of distortion" among our three species. If an ontologist objects that we may have dealt with "appearances" therewith but ignored "reality," we can add only this: it is better to have "holes" in our knowledge than to camouflage our ignorance with "mirages." We cannot say, therefore, what "reality" is in the traditional, ultimate, absolutistic sense of that word unless, *a la* Charles Peirce, we suggest that it is what human understanding would approach as a limit after indefinitely prolonged scientific inquiry. We prefer to speak of "undistorted information." Any and all information may be legitimately construed as undistorted if none of it gives us trouble. When we *are* in trouble, it is best to apply our arsenal of strategies for coping with the distortion of

information. It is best *not* because trouble necessarily *implies* such distortion. It is best not *merely* because we have inductive evidence that when troubles occur we can usually abate them by treating some information as though it were distorted. It is best, rather, because employment of the strategies entails the making of inductive inferences. These latter, applied in sustained fashion, are in a restricted but important sense "self-corrective." If knowledge be a cure for the trouble, then inductive procedures will cure the trouble through accretion of further relevant knowledge.

NEVERTHELESS, in this dawning Age of Space, we might helpfully alert ourselves to the exotic ways such knowledge might be coded. We can imagine a Martian scientist who, let us say, suffers from "mirages" in his tactile sense but has never found reason to doubt his eyes. Such a Martian, upon discovering that a "straight" stick "bends" when placed in water, might succeed in fashioning a tissue of information recording this observation and lacking FD and MD both for him and for us Terrans. In brief, he might maintain that the stick "really" bends but that the fickle sense of touch makes it still "appear" straight. The *remainder* of his physics, we are sure, would prove immensely complicated and inconvenient to us men of Earth. But we are convinced, also, that were the Martian the Einstein of his planet, the *whole* of his physics might suffer, at worst, only SD with respect to our own.

STATUS SYMBOLS AND THE TIMECARD EMPLOYEE

ELLENTINE M. MULLANEY *

STATUS SYMBOLS are usually discussed in terms of cars and clothes and country clubs; of houses, hats and high rank. There is no intention here to dispute the importance of such large and "impressive" material things. But there is another area—a much humbler area—where the small status symbol is of the utmost importance.

The small status symbol is important to timecard employees of the retail trade.[1] Management, in the press of other matters, often overlooks the significance of these symbols. But given the awareness to recognize these symbols and enough skill to read the messages they communicate, management can prevent much employee friction and cultivate a more pleasant, productive and profitable working atmosphere. To put the matter into the pompous abstractions of business-ese, intelligent and sympathetic understanding of the small status symbol helps build good morale. I am sure the bosses I have worked for would "buy" that statement. Most of them would nod wisely at the sound of it and then would proceed to operate as usual with an eye fixed sharply on the net profit.

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* This paper was written in connection with Dr. S. I. Hayakawa's seminar in Communications in the 1959 Summer Session of San Francisco State College. Mrs. Mullaney was, from 1941 to 1951, except for two years as a naval officer, personnel manager of a large west coast department store, one of a national chain. She later was a member of the national personnel staff in the company headquarters in Chicago. At present, she is a graduate student at S.F.S.C.

[1] Vance Packard, *The Status Seekers*, (New York: David McKay, 1959), p. 41. "Below the two classes cited [real upper and semi-upper] which comprise the diploma elite, is a gulf and beyond that gulf are the supporting classes . . . the anonymous or little people—the vast masses who can be hired interchangeably to do the routine jobs in factory or office."

After making his study of bureaucratic trends, Peter M. Blau of the University of Chicago stated, "A large and increasing proportion of the American people spend their working lives as small cogs in the complex mechanisms of bureaucratic organizations." The company for which I worked had much in common with a bureaucratic organization.

Buried well down in the complex structure of the Company, you find the "small cogs." Their pencils mark the inventory sheet. Their fingers punch the keys on the cash register, the comptometer, the marking machine. They push the levers on the freight elevator and pound the typewriters and plug in the jacks on the switchboard. They tally the cash receipts at night. They stock the shelves and bins and tables and they sell the merchandise. They are the indispensable, the all-important crew without which the wheels of the Company could not turn—nor the profit be made.

The chances are that they have never heard of a status symbol. They will fight for the reassurance the possession of such a symbol brings. They will be uncomfortable if such a symbol is destroyed. They will be upset and unhappy if one is awarded to or pre-empted by someone the group does not recognize as deserving it. And they would be amazed to hear it called a status symbol. They would be quite likely to look up and say in a puzzled voice, "Status symbol? What's that?"

Yet, they would be likely to do bloody battle for the top drawer on the cash register or for that special slot in the timecard rack because they considered it "theirs." Sometimes such things are acquired by promotion and sometimes by clever maneuvering. But usually they are gained by right of long practice or by right of time endured. Seniority is a word the employees know. The importance of the small status symbol is well understood and respected by them as a group.

TRYING very hard in their own way, timecard employees are often not clear as to the direction or goal of their careers. Often they are torn in the conflict between their dreams of success and their inability to reach that success. It is at the point when the employee realizes he is a small

cog in a very large machine and that he probably will remain a small cog, that the little status symbol assumes tremendous importance. Vance Packard, who calls this group the "limited success class," quotes Joseph A. Kahl on this point. They are "constantly striving to get ahead: yet most will never get very far, and after they have outlived the romantic dreams of youth, they know it" (p. 42). When ambition has been worn down by the weight of day piled upon day and year piled upon year; when the employee begins to realize that he has "gone as far as he can" and with this realization has also faced the fact that he probably won't quit his job, he begins to guard and cherish more carefully the small things which give him a feeling of personal importance within the working group.

He may then be willing to assume responsibility for the keys to the store's front door. At best, from the standpoint of management, locking and unlocking the front door is an all-important sort of nothing-job; one which requires the man responsible to arrive early and stay late. But, it also carries with it the privilege of standing at the front door with one of the executive staff morning and night and of arriving on the sales floor later than the rest of the crew. The light of my memory swings vividly to the rotund silhouette of the pleased and pompous little man with the keys as he greeted the customers each morning and ushered them out each evening. In retrospect, I appreciate how he treasured possession of those keys. They were, for him and for the men and women who worked with him, a symbol of power, a part of management, a token of the kind of authority he knew in his heart he would never have.

IN THIS same vein, there were the department supervisors who would not lend a part of their sales force to another department. They had been asked to do this by a store manager whose interests were so completely bound up in total store sales that he did not recognize the feelings of the small department managers who worked for him. When the store manager insisted on "interselling" between departments, it then

became a part of my job as personnel manager to see that salespeople moved from departments where business was slack to adjoining departments where customer traffic was heavy. Resistance to this sort of shuffling became so strong that the plan of interselling simply did not work in certain areas. One trouble spot lay on the invisible boundary between the hardware and the paint department. It was a season when hardware—the nuts and bolts, tools and garden supplies—was selling. Paint was not. In spite of this, George, who ran the paint department, found work for his people to keep them away from the hardware tables, even if he had to send them to the stock room to dust the tops of paint cans.

I remember talking to him about it and how he said, with much emotion, "Look. That's *MY* crew. They work for me. I've worked for the Company fifteen years and I know I'll never do any better than run the paint department. But my bonus is based on paint sales so why should I help hardware?"

When management looked at his question from George's standpoint, it was a good one. I explained to him that helping the other department really did help him; that by increasing total store sales we also increased total Company sales on which his yearly share of Company stock was based. After thinking that one over, he reluctantly sent two of his salesmen over to the hardware department.

Unfortunately, he could not seem to understand that by building a mental fence around the paint department, he had made sure he would "never do any better." By not being able to see beyond his own little area on the sales floor and by making the control of his crew a status symbol, he had placed himself in the unpromotable category. At the time of our conversation, George had never heard of a semantic approach to problems—and neither had I—but he was a pretty good example of a human being doing his best within the little trap of himself as he frantically reinforced his defenses by building a barrier around *his* territory.

THERE WERE many other symbols much contended for; such things as choice lunch hours, wages, method of pay-

ment, the business of who punched the clock and who signed in on a sheet of paper, who got which time on the vacation schedule and who could be assigned a parking space for his car. Then, of course, there was the privilege of not ringing the cash register—and the privilege of ringing the "A" drawer. ("A" drawer on the cash register was, by long practice, usually assigned to the department manager, or in the very large departments, if he did not sell, to his assistant.) The importance of this small matter came to light when the Company decided to discard individual cash drawers and install a system of common cash funds. Under the new system, everyone in a department used the same cash drawer. Much of the resistance and confusion that resulted, stemmed, I feel sure, from the fact that we had destroyed a familiar status symbol.

Service pins were another symbol. These were awarded, as is customary with many large companies, at five year intervals, changing in shape and becoming a little more ornate each successive five years. For both men and women they were worn proudly as a badge of honor at the five- and even at the ten-year period. At the fifteen-year period the picture changed. Men still were willing to receive their pins before a general all-store meeting and to wear the pin proudly. With women employees there was a great reluctance, especially if they were unmarried and still young-looking, to accept the pin before a general meeting. Those who did consent to accept the pin publicly rarely wore it.

Among the office force, the placement of a desk could actually spell position in the scheme of things. Nor did the same pattern hold from office to office or from store to store. When office spaces were remodeled from time to time, it was necessary to evaluate carefully what each employee's new location would mean in the remodeled office to insure a smooth continuance of the work output.

NOR DID the business of status symbols end with the sales force and office workers. It extended on into the lower

executive levels. Here are two instances which involved me personally.

Upon the occasion of one store remodeling, the entire personnel office was moved to another floor and redesigned. In the course of the planning one of the experts in space allocation came to see me. We discussed the plans and what desks, file cabinets, and other equipment would have to go where to handle the flow of applicants and employees—and such things as who needed to be accessible for employee questions and who needed a little more quiet to accomplish the day's work. Then, just as our talk ended, he said, "By the way, what finish would you like on the furniture for your new office? Light or dark?" I remember reacting to the question much as I had when I was very small and big-eyed and waiting for Dad to carve the Thanksgiving turkey. I said, "If I have a choice, dark, or course. Either walnut or mahogany."

Weeks later my office force moved into the new space. My own furniture was a sort of tired yellow blonde. Feeling much like the fellow who thought he was getting whipped cream and found himself with a mouthful of cream cheese, I asked about the furniture. The answer still rings in my ears. It was simply this, "You don't rate dark furniture." I asked why and was told, "Only men get mahogany." I lost my equilibrium at that one and said in a voice that could have been heard across a drill field, "Then why the hell did you ask me?" Some weeks later, a coat of walnut stain was put on my tired blonde desk. Such was my first personal brush with status symbols.

In *The Status Seekers,* Vance Packard devotes a chapter to the emerging new class he calls the "Diploma Elite." My second personal example tends to support his thesis.

Eighteen years ago, as the only woman and the only college graduate on an executive staff of seven, I learned that my B.A. was a distinct disadvantage. The fact that I had spent four years in a university was actually a barrier to acceptance and cooperation from other members of the executive staff.

The feeling among them—and they did not hesitate to tell me this in plain words—was that experience gained from time on the job would always be more worthwhile than anything in books. It was only after I had lived down the "onus" of my college degree, that I was able to take advantage of my education.

Some thirteen years later, I was transferred to the Company's personnel staff in Chicago. With this flip of the coin, the obstacle course was reversed. The Vice-President for whom I worked, although not a college man himself, had acquired a beautiful diploma collection for his staff. He collected them as some women collect charms for a charm bracelet. He even jingled them now and then. Only three of us had B.A.'s. The rest held M.A.'s, M.B.A.'s, or Ph.D.'s. On one occasion, the entire staff was called in to meet a visiting expert on economic affairs. The introductions went something like this. "This is Mrs. Umpteeump who has an M.A. from the University of Chicago and handles psychological testing," and "This is Dr. Fuzzeetork who has a Ph.D. from Northwestern and heads our training department," and so on through scores of junior executives and department heads. When it was all over, I fled as fast as I could with the realization that on this crew, promotion and all, I had a kinship with the timecard people. Mine was only a B.A. from a west coast state university! Ironically enough, my job at that time was to write the materials for the Company's College Recruiting Program.

In his beautiful office, beaming and basking in the reflected glow of his diploma collection, the boss had failed to assess the reactions of his "educated" staff. As one might assume, the nonverbal message from this incident was pretty thoroughly analysed and verbalized by the staff during the afternoon coffee breaks. These people resented being exploited and, much like the timecard people, blew steam by telling each other about it. Nobody quit over the incident—at least not immediately—but the wheels on that particular day ground to a slow, crunching halt. I tell the story in support of my earlier statement that where management is skilled enough to read

the nonverbal messages, a productive and profitable working atmosphere can be cultivated.

THEN, there was the symbol of the Company itself. For the people who had worked for it through a period of years, the Company became a sort of great father figure. I use the word "father" advisedly. Like many large corporations whose policies were formulated during the early 1900's, this was and still is, a man's company. As such the Company became a symbol in itself. For the employees, the Company represented security. They knew this in many ways. They knew it through the policy of "promotion from within," through the emphasis on seniority, through the program of employee benefits. The old timers could tell the newer people about the stock splits which had doubled or trebled their profit sharing accounts, and now and then, you heard the story of the porter, who having pushed his broom for thirty years, had retired after the last stock split with better than $70,000 in Company stock. The Company had provided for him.

These were the things that built the father symbol and the symbol, after a certain period of years, chained the timecard people within its shadow. This was the reason George would stay in the paint department even though he knew he probably would never "do any better." Looking back on my own years with the Company, it seems to me that the Georges reached a point of no return. They could climb no higher and yet they could not quit. As one once said to me, "You know, I've never worked anywhere else. I wouldn't know how to look for a job." The Company had become a way of life for him.

THE CHICAGO YEARS bring to mind one other small status symbol. The weather being what it is at the southern tip of Lake Michigan, fresh air is a precious thing. There were those summer mornings when you wanted to get up early enough to get a breath or two before the rest of the populace had used the air too much. Shortly after I joined the staff,

I learned with some amazement that windows were a status symbol. As such, most of them belonged to the higher salaried men on the staff. Only one woman had a window and she had it by default.

During World War II when talent of all kinds began to grow extremely scarce, Emma had been promoted to head of the national training department. She was not a college graduate but her years of practical, on-the-job experience were valuable and kept the training department functioning. The war years rolled on, and although she had been told at the time of the promotion, that the assignment was "for the duration," she began to believe that she would be able to keep the job. She had seniority. She had been promoted from the ranks and during those years when she faced very little competition, the performance of the training department "looked good" and she had been praised for it. Then, sometime in 1946, the gentleman with the Ph.D. was assigned as the head of the department. Emma gave up the corner office and became his assistant. She didn't oppose the new department head openly but she did fight to keep an office with a window. It wasn't much of a window. It was dingy and cross-hatched with security bars. It looked out onto a grimy court filled with smoke and steam from the central heating system. But it was a window, and Emma was the only woman on the staff who had one.

We all knew this story and the general feeling seemed to be that Emma, having been kicked upstairs temporarily and then unceremoniously demoted, had earned her window. In the opinion of the group, she deserved her status symbol.

HAVING brought these examples through the door and taken them out the window, I wish to make it very clear that status symbols are only one facet of the tremendous job of personnel management in a large company. By turning the spotlight on them here I do not wish to over-emphasize their importance. There are, and there will probably continue to be, times when top management will ride roughshod over the status symbols of the employee. But I believe that if, some-

where among the line executives of that management, there exists a semantically oriented recognition of the feelings and the reactions of the employees, much will be gained for the good of employer-employee relationships. If management is aware of these matters, if the messages can be acknowledged, that nebulous thing the Boss calls "good morale" can be built.

•

WHAT'S IN A WORD?

What's in a word?
Why, all of man's known nature:
Even the feathered, fluttery, flying, singing thing
Was not a bird
Until man made it to a word.

What's in a word?
Well, Time, with a restless past—
Life, in a restive place—an upgrasped sword
An ever-present shield—
All of tomorrow than can never be concealed.

What's in a word?
What is in a word? Today
All of the debt we each have failed to pay;
A whole completed through the self,
A sudden sky,
Rhythm wind rain pain laughter you—I.

CAROL SHINE

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JAINISM AND GENERAL SEMANTICS

EDMUND J. FARRELL *

ONE of the unexpected places in which we discover teachings similar to those of general semantics is the Jainist school of Indian philosophy. In his *Power of Words* (New York, 1954), Stuart Chase has presented a summary of the theses of general semantics, most of which derive, of course, from Alfred Korzybski's *Science and Sanity*. It will be convenient to make our comparison of Jainism and general semantics by reference to Chase's book. The parallels between the two can be discussed under four topics: the relativity of truth, the dynamic unity of nature, awareness of levels of abstraction, and verbal limitations.

The Relativity of Truth.

WHILE Jains believe that an omniscient being can obtain (through *kevala-jnana*) an immediate knowledge of an object in all of its aspects, "imperfect beings look at objects from one particular point of view at a time and have consequently the knowledge of only one aspect or character of the thing" (S. Chatterjee and D. Datta, *An Introduction to Indian Philosophy* [5th ed.; Calcutta, 1954], p. 82). Moreover, human judgments are considered true only if they are accurate within the context in which they are made and only if they actually lead to the goal toward which they point. One cannot assume, however, that the Jainist philosophy advocates the doctrine that ends determine or justify means, for, as S. Dasgupta comments, valid knowledge must be free from contradiction. The individual is not at liberty to warp the "truth" in the interest of serving his purposes.

> The validity of knowledge thus consists in this, that it is the most direct, immediate, and indispensable means

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> for serving our purposes. So long as any knowledge is uncontradicted it should be held as true. False knowledge is that which represents things in relations in which they do not exist. (S. Dasgupta, *A History of Indian Philosophy* I [Cambridge, 1951], 183)

This "false knowledge" appears, not primarily when one's judgments are contradicted by another's, but more often when the individual finds himself holding a belief which *he* knows to be contrary to the facts. In Jainism there is a deep appreciation, if not for error, at least for the limitations which are attached to any one man's perspective. S. Chatterjee and D. Datta, as well as S. Redhakrishnan, remark on the Jains' fondness for the old story of the six blind men who laid hands on different parts of the elephant and then proceeded to try to describe the whole animal. Only he who sees the whole animal understands that, while each description is valid within the limits imposed by experience, each judgment is incomplete. In short, limitation of experience or perspective may constitute ignorance but not necessarily error. He who sees the whole animal is a symbol for the liberated individual who has experienced *kevala-jnana*.

Most men fall short of the omniscence given in *kevala-jnana*. With humility and caution, they must move about in the arena where limited perspectives are held and partial judgments are made. This circumspect attitude finds expression in *syat* ("somehow" or "maybe"). By prefacing a judgment with *syat*, the Jain indicates that he views nature from a particular point of view. An opening is provided for other *syat*-judgments—for other voices from other rooms. The function of *syat* is similar to that of *etc.* and the indexes in the language of general semantics. It is a verbal sign of the multiordinal character of events and expresses the fact that our judgments are made on the basis of a partial apprehension of reality.

The Dynamic Unity of Nature.

THE JAINS are conscious of the fact that speaking of objects in isolation from the rest of nature introduces a distinction in language which does not reflect the integral character

of the universe. Both positive and negative marks must be specified for any object (this cannot, of course, be done exhaustively). In order to tell with some degree of satisfactoriness what an object *is,* we must also say what it *is not;* and *vice versa.*

> Every object is what it is because of its positive and negative characters. The positive characters which determine, for example, an object like a man, are his size, colour, shape, weight, constitution, heredity, family, race, nationality, education, employment, place of birth, date of birth, habitation, age, etc., and the numberless relations he bears to the uncountable other objects in the world. The negative characters which determine the man consist of what he is not. (S. Chatterjee and D. Datta, p. 89)

The Jain also shares the general semanticist's idea that time indexes are necessary to indicate that nature, although one, is a process. In the interval in which we seek to define an object, it escapes us; for what it is now $_1$, it is not . . . now$_2$. And even if something called its essence were to persevere, its qualities would not. In and all around us is the flux of nature, which we can no more seize than we can grasp the wind.

> If we consider, then, an object in the light of its own positive characters and also in the light of the characters of all other objects which are absent in it, the object would no longer appear to be a simple thing having only a limited number of qualities, as we ordinarily take it to be. The object, on the contrary, turns out to be one possessed of unlimited characters. But when, moreover, the element of time is taken into consideration, and it is remembered that the object takes on new characters with the change of time, the object is found really to possess infinite characters. (S. Chatterjee and D. Datta, pp. 89-90)

In the face of the dynamic character of nature, the Jain's *syat* leaves a trail of omitted qualities as long as that left by the general semanticist's *etc.*

These Jainist ideas are, of course, close parallels to some salient themes of Korzybski's *Science and Sanity* and of general semantics. For, in the Indian philosophy too, we find accents on the foolishness of trying to snatch objects out of context, on the interrelations of all things in nature, and on the processes at work in the universe.

Awareness of Levels of Abstraction.

IN DISCUSSING the *artha* (object or meaning) *nayas* (knowledge of things in their relations), S. Redhakrishnan observes that "Jainism admits the distinction between *amanya* or universal and *visesa* or particular features, though it regards it as a relative one" (*Indian Philosophy* I [New York, 1951], p. 300). Moreover, in commenting on the doctrine of *nayas*, S. Dasgupta writes:

> In framing judgments about things there are two ways open to us; firstly we may notice the manifold qualities and characteristics of anything but view them as unified in the thing; thus when we say "this is a book" we do not look at its characteristic qualities as being different from it, but rather the qualities or characteristics are perceived as having no separate existence from the thing. Secondly we may notice the qualities separately and regard the thing as a mere nonexistent fiction . . . ; thus I may speak of the different qualities of the book separately and hold that the qualities of things are alone perceptible and the book apart from these cannot be found. These two points of view are respectively called *dravyanaya* and *paryayanaya*. (pp. 76-77)

According to the Jains, both points of view are limited. Thus, if experience is interpreted and systematized from either point of view to the exclusion of the other, error (*nayabhasa*) results.

> Affirmations or judgments according to any *naya* or standpoint cannot therefore be absolute, for even contrary affirmations of the very self-same things can be held to be true from other points of view. The truth of each affirmation is thus only conditional, and inconceivable

from the absolute point of view. (S. Dasgupta, pp. 78-79)

General semanticists have emphasized the need to notice the manifold qualities or characteristics of any given thing and to recognize that those qualities distribute themselves on several levels of generality. Of course, we cannot dispense with abstractions, for simply to denote each thing in the world by a proper name (if, indeed, this were possible) would be to strip the universe of meaningful and useful relationships. The danger lies in forgetting the extensional ground upon which abstractions are erected, not in the abstractions themselves.

> Why use abstractions at all, when they can be so dangerous to understanding? Why not always point to what you are talking about? Well, why use water at all when you can drown in it? Without abstractions we could not think in a human way. The problem is to be aware of them, to remember what level the discourse is on. . . . (Stuart Chase, p. 142)

Jainists and general semanticists both discover a fluid, reciprocal relationship between particulars and universals. Asserting the importance of the one to the neglect of the other is to limit unnecessarily one's perspective on nature and his knowledge of it.

Verbal Limitations.

ON THIS POINT, we shall simply observe that both Jainism and general semantics recognize that language has limitations. For the Jain, there is an absolutely (*paramarthika*) immediate knowledge which the soul attains by removing its *karma* obstacles. The *kevali* (or omniscient, liberated soul) thus transcends verbal bondage. He *knows*. While general semantics seems not to recognize the possibility of this kind of knowledge, it does assert that verbal discourse is not to be equated with experience. At the endpoint of all verbal behavior are undefined terms. Beneath these primitive words is the unspoken level of experience. When the unspeakable and the word interact, it is the word which shapes or interprets the experience.

> The linguists are making us realize that language is not a tool with which to uncover a deeper vein of reason, universal to all thinkers, but a shaper of thought itself. Shaping the thought, it helps to shape the culture. . . . They are making us realize that we get our view of the world outside our heads probably as much from the words inside as from independent observation. When we try to become independent observers, futhermore, these words, unless we take special precautions, may distort the vision. There is no reason to suppose that English, French, Spanish, or any other Western language, with its two-valued logic, its subject-predicate form, and its law of identity, is the ultimate in a communicative system. (Stuart Chase, p. 109)

We should observe that Susanne Langer in her *Philosophy in a New Key* (New York, 1948) argues that languages are only one kind of translation of experience. Man uses other sorts of symbols—music, ritual, sacrament, and dance. Inasmuch as natural languages are only one sort of expression of the unspeakable level of experience, they are but a limited mode of symbolic activity among men.

THERE MAY be many more differences between Jainism and general semantics than there are similarities. But, at the points of recognizing the relativity of truth, expressing the limitations of any man's perspective, understanding verbal limitations and the levels of abstraction, and reckoning with the dynamic character of nature, *syat* Jainism and general semantics are in striking agreement. *Etc.*

THE WRITER'S ITCH (II): HOW WRITING IS WRIT

MARTIN MALONEY *

THERE ARE three elements involved in any piece of literature: the writer, a set of events which prompts him to write, and the words which he puts down on paper. But do not be deceived; the act of writing is an extremely complex matter, so much so that many writers, rather than try to understand it, have developed a mystic theory that writing is the product of inspiration, or rather, expiration—i.e., one or another of the Muses blowing down the back of your neck.

Difficult or not, let us see what we can make of it.

FIRST OF ALL, there is the writer. A good writer is a little like an English sports car: he is loaded with complicated and delicate machinery, each separate unit of which often requires individual attention.

He is equipped, for example, with various mechanisms which pick up stimuli from outside his skin: he can see, hear, smell, taste, detect changes in temperature and pressure, and so on.

He is also equipped with what would be called in an electronic calculator a "memory bank"—a set of machinery by means of which he can reproduce his sense experiences symbolically, and can store up these records, and can recall various segments of his past experience more or less at will, and "re-live" the experience by exposing himself to the symbols which represent it.

Finally, he has, as part of the structure of his nervous

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system, a device which in some respects is like a large telephone exchange, which can set up a great number of connections among recollections and perceptions, which permits the writer to manipulate and alter the character of his present sense world, and of his past—which, in short, can set in action the assorted mechanisms which permit him to come away from his typewriter clutching a half-dozen sheets of paper covered with smudgy black marks.

Observation: Of course, all human beings come similarly equipped, although with some you would never know it. What distinguishes a good writer is not his bulging cranium nor the fact that his typing (index or middle) fingers are an inch longer than the average. It is rather that, whatever equipment he was born with, he has learned how to use it. A writer of any competence whatever must (a) be able to experience more (i.e., see hear smell taste etc. more) and do it more flexibly and variously than anybody else; (b) remember his experiences more accurately, more vividly, and in a greater variety of ways, than anybody else; (c) be more concerned with the *meanings* of his experiences and memories than any sensible person would be; and (d) find the process of manipulating experience symbolically a perfectly fascinating affair. (That is, a good writer is a pathological liar who makes a profession of his compulsion.)

Warning: A writer is thus a person who can and does gaze for hours in rapt concentration at his thumb, who spends much of his working day gaping emptily at nothing, and who may become violently indignant or happily enthusiastic over the possible significance of the small print found on cigarette packages.

In order to accept these facts, and not worry about them, non-writers have for millennia believed and have freely remarked that all writers are crazy. That they usually are not, is one of the most closely guarded secrets of the profession.

A qualification: It must be admitted, however, that writers *are* chronically disturbed. If they were not, what reason would they have to write? Only occasionally, however, are these disturbances really pathological.

NEXT, we have the event which prompts the writer to write. This may be anything or any cluster of things, from an apple to a light in the sky to an old man dying.

Writers do not, in fact, write about events, but about their reactions to their recollections of them.

The essential point is that writing is the product of a relationship between a writer and an event.

Many remarkable observations grow out of this fact:

• Item, that any writer who claims to write "objectively" —that is, directly about events and nothing else—is a liar, and will burn in hell for all eternity unless he repents.

• Item, that any writer who claims his writing to be "pure art"—that is, completely the product of his own genius, without reference to events—is a poseur and a fraud.

• Item, that a writer who tries to report "facts" has his job cut out for him. He must say, "Looking at this event on such-and-such a day from this-and-that point of vantage, this is what I saw." He cannot expect people who saw the event on another day, from a different vantage point, to agree with him; but he may suppose that they will respect him as an honest man who told the truth as he saw it.

• Item, that a writer whose works deal with a relatively simple relationship between himself and an event (see above) is likely to be a writer of non-fiction; that a writer who manipulates and combines events, recollections of events, and his own reactions in a very complicated way usually writes fiction or drama; that a writer whose writing deals with the endless complexities of reaction to events (which may be great or trivial, but are not stressed in the writing) is a poet.

• Item, that a writer of essays is a discursive poet who cannot rhyme.

• Item, that scholars, critics, and plagiarists are all writers whose relationship is chiefly with the works of others.

An addendum re events: Events, no matter how simple they seem, are in fact infinitely complex.

A good assumption about events is this: no event has any pattern whatever.

Or, no data have a logic.

In short, whatever pattern, order, structure a writer perceives in an event are contributed to it by himself.

Note that this is an assumption, not the truth.

A writer may also assume, if he wishes, that there is an ultimate order in events, for which it is his business to search.

But which he will never discover or state.

No matter, no matter.

In either case, a writer's perceptions of order, and his statements about them, will be subjective and imperfect. Therefore he is free, within the limits of his talent, to impose orders on data, the most meaningful, true, and/or useful orders he can discover, understanding either that there is no perfection or that he will never achieve it.

The ultimate, absolute, correct order—the perfect understanding—of events is beyond human reach, within the grasp of God.

And even to conceive that such an absolute ordering of events exists, or can exist, depends on faith, not investigation.

Conclusion: It is in the investigation of form, of order, of structure, that writers reach their greatest achievements.

Content is human, within everyman's reach.

But form—form is divine.

AND FINALLY, we have the work, the writing itself. This is a series of conventional marks stamped or scratched upon paper, which purports to represent, much as a road map represents the concrete highways set into an expanse of earth, towns, farms, and factories, one or another of the various and complex relationships which we have suggested above.

The problem: It is not at all easy, even for a writer, to evaluate a piece of writing as a statement about relationships. Indeed, our habits and our language alike lead us to assume that writing is about things and people. Yet this evaluation can be very deceptive. It is clear that you will never encounter, in life, John Keats' Grecian urn. But how then account for what he said about it? A vivid imagination which distorts "facts"? Or just, poets talk funny?

Obvious Observation: The words which writers use have

arbitrary meanings, which vary from person to person and from time to time. These words do have common significances of a sort, which are the product of rather rough social agreements, some record of which you can find in a dictionary.

But dictionary meanings are minimal, to say the least. The best possible dictionary definition of the word "apple," for example, would contain only the common features of the endlessly varied meanings of the word as used by the 300,000,000 individuals who speak English, all of whom have had different experiences with apples.

This is not much of a definition. Yet any definition you will encounter in a dictionary will be not nearly so good.

Also, writers—who are aware of the possibilities and limitations of language, and are sometimes capricious fellows as well—on occasion will deliberately cultivate a "private language," in which words are used in almost totally unexpected ways.

It's a wonder anybody can understand anybody, isn't it? And yet—

It is just this caprice, this arbitrariness, this flexibility in symbol-manipulating which permits a writer to map, sometimes with great precision, the subtle, wavering, and complex relationships in which human beings are involved. Perhaps the privacy of his language is a recognition of the uniqueness of all such relationships, while the areas of agreed-upon meaning make his statements accessible to others.

How else shall we account for the contradiction in terms presented by *Don Quixote*, or *Lear*, or *Pickwick?*

For these works, like all great writing, are highly personalized, individual documents which, in a completely improbable way, are profoundly significant to millions of people, living in different cultures at different times.

All right, it's an inadequate explanation of a puzzling phenomenon.

But it's the best we can do right now.

Therefore, let us pass to other things.

(To be continued.)

FILM CRITICS IN BLINDERS

KEN MACRORIE *

ALTHOUGH moving pictures have been shown in America since 1903, most critics still discuss them as if they were plays or novels. A movie review customarily opens with a cleverly stated overall estimate, moves on to recount the plot, makes some remarks about the acting, and ends with a judgment playfully related to the title. Much is said about literary, dramatic, and philosophical effects, but not a word about filmic effects.

This is a remarkable failure in an age so dedicated to the communicative arts. We have brilliant criticism of books and plays by men who understand the crafts of writing and acting. At least they react to the way the man has put together his sentences, his scenes, or his scenery. But most film critics do not react to the way the filmmakers have put together their film. They do not see the film as film.

I am not saying that they should ignore the acting, the story, and the moral implications of a movie. What any work of art says of man and his nature should be the first concern of a critic. But each artistic medium says this through different means, and most film critics seem unaware of the nature of the means in filmmaking. They do not see that a film is a succession of pictures put together to move as a stream upon the senses, one picture on top of the other, growing out of the other. They write as if that stream of pictures is created by developing an exposed roll of film and projecting it on the screen, as in the making of a home movie. In reality, it is created by splicing together short sequences of film in new order, through a process called *editing*.

How can a film critic learn to judge the editing of a film? One way is to linger a few minutes in the theater to see a part

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of the film over again. Another way is to see the whole film again another day. The viewer must see the film as a series of shots. While one shot is before him, he must expect a visual shock, a new camera angle or position. Another shot will leap to the screen, or fade in from the present shot. Suppose the screen shows a woman's face. She opens her eyes wide, she blinks. This is all the same shot. Then her whole figure appears, not just her face. This is a new shot. If the camera had merely panned down from her face in one motion until it reached her feet, only one shot would be involved. Looking at the film as film, the viewer feels a break or a dissolve when one shot replaces another—a pulling, a jerk, or a slap to the senses.

Once aware of separate shots, the viewer can study the stream of pictures, forgetting the story and concentrating on the shot now on the screen. Before it passes, he guesses what is coming next. Closeup of that woman's face. She blinks. What shot will follow? Long view of her body? Long view of the person or object that made her blink? Closeup of part of that person or object, perhaps a hand rising, a door opening? This simple act of trying to guess the next shot reveals the essence of film.

THE FILMIC EFFECT happens because a man can look at a series of still pictures flashed consecutively on a screen and see two kinds of motion. The first kind is the illusion within the individual shot: the horse running, mane in the wind. The second is the illusion of motion from shot to shot: action to action, place to place, events moving in space and time. The mainstream of film flows in this second kind of motion, and yet it is this stream which most critics never discuss.

Consider a recent American film, *Crime and Punishment, USA,* not just an entertaining movie, but a genuinely moving picture. It is a modern telling of Dostoyevsky's great novel, reportedly made on a budget of $100,000 (not $4,500,000 as for *They Came to Cordura*) by two recent graduates of the University of California, Terry and Denis Sanders.

When Bob Cole, the hero, walks through the carnival streets of an ocean-side town tormented by his crime, it is his face in closeup that walks, not his whole body. The filmmakers want the viewer to think Bob's thoughts, not to look at his clothes. His giant face bobs up and down on the big screen, and in the rectangle—black night, the white dazzling lights of the turning ferris wheel, the neon signs. Moving through this patchwork of black and white created by swinging lights, his face is the middle grey tone. Then the closeup is gone and his whole body appears. He is moving into the darkness of a deserted pier which stretches out into black water. The lights have all disappeared except for a few dancing reflections in the water as the camera fixes on them in closeup. The movement has been from black and white dazzle to black with only pinpoints of white. Next shot: a closeup of large white coffee cup, a man's fingers tapping on each side of it. The camera moves back to reveal Bob sitting in the white booth of a restaurant. Shot of the white restaurant walls and the counterman working. Everything white. Out the large window, slightly up to the street, black night framed in white of restaurant walls. Into that black comes a girl walking past the restaurant. She is dressed in white sweater, white dress, white scarf tight against her black hair. She stops in the black night, considers Bob, moves to pass on, but changes her mind and enters the restaurant. She comes up to Bob in the white booth, introduces herself as the girl whose father he helped home after a heart attack. As she sits, all white in the white room, the camera closes in on her to show startling black—her long false eyelashes. She is suave and cool and refined. But the black eyelashes are disturbing. Visually, the viewer is being prepared for a later revelation: she is a genteel prostitute. This sequence is a beautifully constructed stream of pictures.

Perhaps the makers of *Crime and Punishment, USA* achieved some of their fine effects unintentionally. They may have planned the coffee cup as a cue to the watcher that Bob had moved from the pier to the retaurant, without realizing that in closeup the cup would be a visual blast of

white after the dark night, and a perfect lead-in to the white restaurant and the girl in white. Color comes through symbolically in this sequence: black for Bob's despondency, white for hope, black on white for evil.

Near the opening of this film, the camera, roaming a seaside California town, looking down on roofs of houses and factories, catches several sea gulls for a moment, and then closeup of the gulls soaring freely, then back to the town, with strident music building up. On my first viewing of the film, I sensed the mounting tension of this opening, but not until the second viewing did I realize that the roaming camera had been jiggling nervously as the titles were flashing on the screen. In the Broadway theater, the director cannot make the whole scene jiggle nervously. In real life, a man can't look at seagulls flying far overhead and bring them quickly into closeup, unless they fly down to him. Film has its special potentialities.

PERHAPS the reason that relatively few films are first-rate works of art is that their makers have too much freedom, too many possibilities in their Pandora's box. They can put any picture on top of any other picture. A large section of the slightly curved earth's surface may precede a closeup of a fly's eye. In the unheralded film of a year ago, *The Left Handed Gun* (a psychological investigation of the killing urge of Billy the Kid, who was played by Paul Newman), a man was explaining to his cohorts his plan for a bank robbery. He stood at the hotel room window and drew a simple diagram on the moisture-laden glass. The camera moved in to the window and the next shot revealed the street below and the bank and the men were there in the street as diagrammed and the viewer was in the actual robbery, all in one quick stream. A Broadway play cannot do quite that, although it may in other ways telescope time and space.

With these limitless possibilities for making visual connections, the filmmaker is more apt to create a welter of disconnected shots than a stream that flows from a beginning to an end. Faced by this danger, many filmmakers play it safe.

They photograph scenes as if they were shooting a staged play, merely interposing a closeup or two to remind watchers they are looking at a movie. These filmmakers are unwilling to put an idea, a symbol, a quick change of orientation into the stream for fear they will upset some literal-minded person in the audience. Occasionally they will use a symbol, an old chestnut: lovers look meaningfully at each other; sink down into beachside grass; a big wave cresting, spills over, runs up to wet the sand.

A film shot provides the watcher with almost life-like proliferation of detail. Consider a simple black and white film shot of a man sitting, reading a paper. The viewer sees him down to his waist, a wall in the background, part of a wall on the right. On the table to his left is a lamp of the early American twenties, ribbed-glass shade (probably many-colored), two long tassels for turning on the two lamp bulbs facing in opposite directions, lying in the same plane suspended by two metal pipes emerging from the central lamp stem. . . . The detail I am giving is already becoming inordinate. Yet think of how much more detail the picture itself presents. I have not said a word about the appearance of the man, the wall, the other objects in the room.

The novelist or poet never unlooses such a flood upon the senses. He may go on for pages, but he never presents all the detail that a photograph holds for the taking. Of course, the catch is that our eyes do not move to all objects in the picture. We look at a film as at reality, seeing only what we want to see, what our particular purpose or past experience leads us to focus on. When the filmmaker presents his viewers with a long shot of a room or a countryside filled to brimming with things, he can never be sure which details they will fix upon. He may utilize a closeup to jog them by a detail he wants to emphasize. But even then, the viewer may not perceive as the filmmaker wishes.

For example, when I saw the film *Compulsion,* I missed on first seeing what I imagine director Richard Fleischer thought was a stunning detail. When Judd Steiner and his brother argue on the grand staircase of their father's mansion

about Judd's relationship with Artie Straus, I sensed they were getting close to mentioning homosexuality—I had read the book. At the climax of the conversation, Judd's brother, describing Artie, said in rising voice, "a dirty, filthy—" and was interrupted by Judd. As they shouted, one stood above the other on the stairway, between them an oval painting of two cupids in the center of the wide screen. As the argument ended, for a brief moment the camera closed in on the two cupids, one holding the other affectionately in his arms. When I first saw the film I had been so intent on the boys' conversation, wondering whether Hollywood was going to allow the word *homosexual* or some clear substitute, that my mind had no room for considering the two cupids before me, so plainly a symbol of the relation between Artie and Judd. This example shows what filmmakers face in making their effects with pictures. They must emphasize visually the visual points they wish to make, but most viewers, including many professional critics, don't know how to look at a film.

THE FIRST-RATE filmmaker crowds his shots with things only when his film demands those things. He is a master at simplifying and yet retaining a feeling of the complexity and richness of the real, observed world. For example, Bob Cole, to go back again to *Crime and Punishment, USA,* holding his secret within him stops at a beachside phone booth to call Sally. He stands in the dark phone booth, almost completely in silhouette—black figure in black booth and the window of the booth a bright square of far-away landscape, as in early Italian paintings. As he talks, the bright patch grows on the viewer. He sees two or three persons in the dazzling sun on white sand. They throw a beach ball, they leap and stretch in play as Bob will never do.

The movie screen itself is a lighted rectangle in a dark room. Our eyes do not see the world this way. They can move toward a sound or a motion that they perceive on the outer edges of vision, peripherally. When we sit down in the dark movie theater, we are given an artificially restricted view of life, not only in the carefully chosen stream of shots that

comes at us, but in each individual shot, cut by four hard edges of darkness. Art is always artificial in this sense.

The simplest aspect of film art is the arrangement of elements in an individual shot, what many persons call the "photography" of the film. The makers of *Compulsion* had a Stutz Bearcat roadster and two college boys as their material in the opening of their film, and the wide screen, so elongated horizontally that a large closeup of one face no longer dominates the rectangle as it once did. The filmmakers (note that I must say *filmmakers* because I do not know, as when reading a novel, who was responsible for each choice I am discussing) in one closeup showed the large, heavily-spoked steering wheel on the right, the head of Artie in screen center and the head of Judd at left—three rough circles making a beautiful composition. The use of closeup is often strong medicine in film, and conservative, unimaginative filmmakers employ it only in the most standard, safest way: one face talks in closeup. Another answers in closeup.

The shot in *Compulsion* of the two boys in the car is a strong, but not exceptional, filmic use of closeup. Later, when Artie begins to plot a new crime, the angle is changed and his face appears behind the black spokes of the big wheel, Judd on his left. The viewer may feel any of several significant reactions: the harsh spokes over Artie's face echo his cruelty; the spokes are crosses or bars on his face, presaging suffering or imprisonment. These pictures represent much more than good photography, more than skillful lighting of the dark car in the dark night and Judd's finely chiseled white face against his dark suit. The symbols and the reality coincide.

And so they do in a scene in *Crime and Punishment, USA,* where Bob Cole has stepped outside a night club in answer to a summons by a man in a rain jacket. The man sidles up to him, yells "Murderer!" in his face, and runs down a street off left. Bob runs a few steps after him, then stands looking down the tunnel-like street. Next shot: the camera has moved back and Bob turns, now framed in the black tunnel himself. Again, with no forcing of reality, the filmmakers have given

the viewer a symbol of the boy who will live in a tunnel of fear throughout the film, until he can confess and escape to the light.

BECAUSE a film can move in two ways—motion in one shot and the stream of motion from shot to shot—it can put the viewer inside a moving situation better than any other art form. Even a poor filmmaker can put viewers into the car being chased by the cops. Near the opening of *Compulsion,* Artie and Judd take the viewers for a ride in the Stutz Bearcat. As they sit next to coldblooded Artie trying to run down a staggering drunk on a deserted road in shining rain, they tense with fear even though they have been on a thousand rides like this in movies before. This ride is not new, but it is skillful. Long shot of a man in the road yelling at the boys. Closeup of the boys, Artie smiling fiendishly, Judd stiff, frightened. Shot of the blinding headlights in reflecting water, top half of the man reeling back and up out of the frame, faces of the boys again in the car. The viewer is not sure until one says, "We missed him." The film, through its basic process of splicing shots together, can present actions like these from several viewpoints and blend them into one movement. It can build suspense through quickening motion, through shorter and shorter length shots, through movement from victim to destroyers and back. The old sequence is fundamental: the girl tied to the railroad tracks—the hero sitting at dinner with mother — the train whistles — little brother arrives breathless, "Oh, Mary is tied to the tracks!"—will the hero get there?—shot of train, closer—hero on horse—train closer—etc. In the hands of skillful filmmakers, two simultaneously occurring actions can become a masterful counterpoint. All great filmmakers employ this effect, which is probably more completely realized in film than in any other art form.

Most committed filmmakers say that a film is most truly a film when it proceeds without words. I would not want to be denied films of Bernard Shaw's plays because they are full of talk; yet I believe that the filmmaker who forgets for

many minutes that he is working in a visual medium is no filmmaker. He must continually remind himself that pictures, not words, are his first material. Most educated persons are trained to live with words, not images. They don't look at paintings in a museum; they go by them. Their careful look is at the name of the painting and the painter on the plate attached to the frame. Then one look at the painting and on to the next word plate. No wonder we do not know how to look at films. Nowhere do we spend much time looking at pictures unattached to words. The comforting captions are there in the picture magazines and the copy is there on the poster ads in the subway or bus.

BASICALLY almost everything is visual in a film. And the maker who forgets that truth on the most elementary level gives the viewer a rockety hodge-podge of confusion. He must, for example, give visual, not verbal, cues when he changes scene. Once in watching a Danish film, I was confused because one shot showed a man leaving through a door on the right and the next shot showed another man entering through a door on the right. The two doorways were not different enough to cue me. The result was that I expected Man Number Two to be entering Room Number One and joining a group familiar to me. Instead, he was Man Number Two entering Room Number Two. When the filmmaker moves from one scene to another by means of separate shots, he must provide visual cues of identity; but if he is an artist he does not waste footage in doing this. When the makers of *Compulsion* wanted to move from Judd shouting in a detective's restraining arms, "Mr. Straus killed him!" to a shot of Judd's father, lawyer, and brother, they needed to remember what had gone before, and perhaps what had been edited out. Judd's father had not been seen so far in the film. The filmmakers introduced the new scene by a waist-length shot of Judd's brother, already familiar, standing against the mantel in his home. The camera moved back to disclose his father and the lawyer. Such devices save time, leap over difficulties, and make the stream of pictures seem inevitable to the viewer.

The good filmmaker communicates many of the experiences and ideas of his story without words. For example, in *Crime and Punishment, USA,* Sally is waiting outside her hotel room door for Bob to bring her bags—they have decided to leave town and get married. He has earlier confessed to her that he is a murderer. She feels his torment. Standing in the half dark of the corridor, she hears a shot, and starts. The viewer knows what she fears. She steps toward the door. Bob emerges, bags in hand. Sally reacts silently in deeply felt happiness. She does not have to say, "Oh, I hope he hasn't killed himself. He hasn't. I feel so relieved, because I love him." The sequence is entirely visual and the viewer is in it as a participant.

VISUAL communication strikes differently than verbal. Perhaps it gives us particular pleasure because it is more elemental: man moved before he talked. Consider visual humor. Buster Keaton arises in his multi-million-dollar home and dresses in formal clothes with the help of his valet. He calls for the car and descends to the street where his chauffeur holds the limousine door for him. Keaton announces his destination and the long car pulls away from the curb, proceeds a few feet straight ahead and then makes a sweeping U-turn across the wide street. At the end of the U, it stops at the curb. The chauffeur jumps out, opens the door, and Keaton walks grandly into the house, where he proposes to the young lady, his neighbor. Rejected, he descends to the street, the chauffeur holds the car door obsequiously. Keaton, wearing his sorrow, looks across the street at his own mansion, waves his hand in princely negation to the chauffeur, and starts intrepidly across the street on foot. To see men like Buster Keaton and Charlie Chaplin in their most humorous visual scenes is to understand the potentialities of film. Television comedians, who work through pictures, should be studying these old silent films.

A good filmmaker can make even a shoddy story visually exciting. Life gains a directness different from that of a novel or a play. Rain runs down a gutter as it did for us in child-

hood. We are forced to take time to study wholly a little boy at play. We have before us in racing motion that horse with mane flying. He stays in the rectangle right there; we can study his gait as we can't when sitting at the race track watching him disappear in dust around the turn.

Like the filmmaker, a novelist can present the stream of ideas that races constantly through our minds. James Joyce, in that supremely conscious stream of unconscious called *Ulysses,* writes of Mr. Bloom seeing a blind man on the street:

> Poor young fellow! How on earth did he know that van was there? Must have felt it. See things in their foreheads perhaps. Kind of sense of volume. Weight would he feel it if something was removed. Feel a gap. Queer idea of Dublin he must have, tapping his way round by the stones. Could he walk in a beeline if he hadn't that cane? Bloodless pious face like a fellow going in to be a priest.
>
> Penrose! That was that chap's name.
>
> Look at all the things they can learn to do. Read with their fingers. Tune pianos. Or we are surprised they have any brains. Why we think a deformed person or a hunchback clever if he says something we might say. Of course the other senses are more. Embroider. Plait baskets. People ought to help. Work basket I could buy Molly's birthday.

What the novelist, the painter, the playwright, the poet can do I do not wish to argue. I only ask that the film critic give the filmmaker his place beside them. The filmmaker can also show the stream of thoughts running through a man's mind as he walks a street. His showing of it will be different from James Joyce's, but if he is as good a filmmaker as Joyce is a writer, it will be a wonderful showing and it will carry the special powers and limitations of filmic expression: motion in the frame and motion from shot to shot.

The two kinds of motion possible in film are really its essential strategies of communication. Films have many other aspects worth study, but these two are enough to concentrate on in one's first new looks at moving pictures. As I have said, one simple expedient can help the viewer see these strategies

—looking twice at a film. And to give still another example, when I saw for the second time the scene in which Bob Cole and the inspector in the police office tried to outwit each other, I noticed a shot that had escaped me before. Bob moves to the detective's chair behind the desk, seeking the room's commanding position. The detective, throwing out bait for his fish, walks in a circle around Bob. I see him talking in closeup, then moving in medium shot; and as he gets closer to the camera position, suddenly the whole rectangle of the screen is a blur of dark passing from left to right and I can recognize no object. It is the detective going by. A daring bit of film technique on the part of the director and editor. They succeeded in putting me into Bob's chair and building the circling motion so smoothly that this blur going by the camera seemed right. Actually my eye would not have seen it quite that way in the real situation. I saw this shot only on second viewing. I believe I felt it on first viewing.

The film is a relatively new art form. Essentially its form is a stream of discontinuous shots. Some of its critics, particularly those writing in film quarterlies like the British *Sight and Sound,* have recognized this. And a handful in magazines of more general circulation, like Manny Farber and the late James Agee in *The Nation* and Otis Ferguson in *The New Republic,* have occasionally commented on the visual aspects of films. But the greater number of critics, including most of those who write for metropolitan newspapers, have for years been going to the movies in blinders.

To bring about a revolution in film criticism, no tremendous movement need be inaugurated. Critics do not have to develop and study a great body of literature on the subject. They do not have to look at every movie twice in order to comprehend its essential visual stream with some discrimination. They need only study a few films through twice to make their eyes quick to see film motion and composition and stream. Seeing these processes, they will get more meaning; for meaning always lies partly imbedded in process. Then any movie they see will come through to them not as a play, a book, a painting, a photograph, an opera. But as a film.

MENTAL RETARDATION PROJECT

MABEL TALBOT *

I. Alec

Small boy,
Imperfection-plagued,
Beset by broken or marred or slipshod things,
Learn there can be
Dark riddles of careless workmanship
Flawed things and good things spoiled
And learn that they will do:
Not perfect but all right, made that way—
Even as the one you turn your questions to.
Even as you.

II. Jimmy

A clown, a swaggerer,
The Sullivan himself, Tom Sawyer, or
That one in biceps, tights and leopard skin,
No less. Until a stranger looms
Or friend at a new angle seems to loom
Or a paper falls or something: then he is
Mouse gone berserk or sparrow in a room,
Soft frenzy trapped by spaciousness, hemmed in
By freedom. Samson in corduroys
Pulling an irksome temple down to size.

III. Ann

Child of no words and the eager heart,
What can I give you?

* Miss Talbot is a research assistant in the Mental Retardation Project at Teachers College, Columbia University, assigned to work with pre-school children.

Shall I give you words
For your gray eyes and your smile?
Dull things, words are, not to be mistaken
For the swift dance that is you.
Words and the way to say them are all I know
So for your learning
Give me time for learning
And wait if you will a while.

IV. Rickie

Quicksilver in the palm,
Bright and uneasy to hold as liquid silver;
Not to be grasped: puzzling and puzzled,
Quickness dispersed and spilled—
Silver lost in sand.

V. Juana

"You—nice!" Propitiation
Of angry gods you know?
Let it be so.
But let us give it, altered, back to you.
Let it be love, and true.

VI. Project Staff

"Physician, art thou whole?"
Teacher, art thou wise?
Planner, thy goal?
Critic, how clear thine eyes?
Watchman, how fare thine own?
Comforter, why art thou alone?

VII. Clinic Presentation

Odd?
Or no surprise
That this unfinished child of God
Holds court for all the great ones and the wise?

TELEOLOGY IN SCIENCE TEACHING

A. J. BERNATOWICZ *

EACH OF US is for good and against evil. For most teachers of science, teleology and anthropomorphism are not issues to be debated but to be deplored—we stand against the evil. In keeping with this attitude, I shall not here debate with any who may have philosophical convictions in favor of teleology; their concept of the good differs from mine. I do intend to challenge those of us who argue against teleology but permit it to appear in our own lectures and ignore it in assigned readings.

If science is taught as a body of information, if a science course earns that ever-to-be-prized encomium, "A course with plenty of meat and a hard, solid core of facts," then a certain indifference to frills such as rigorous exclusion of teleology is not surprising, and an obliviousness to imprecise language must be expected. On the other hand, "lightweight" courses, courses designed to meet liberal-arts objectives through an examination of science as an intellectual discipline or through study of scientific attitudes and methods, are likely to contain at least *some* explicit treatment of these "evils," together with some examples of objectionable phraseology which the student (but not the instructor?) is expected to avoid. When teleological, animistic, or anthropomorphic expressions escape notice in the latter type of course, we should perhaps shrug philosophically and admit that we cannot expect the same perfection in professors that we demand in students. Nevertheless, whatever the approach to science teaching, careless language seems inconsistent with our pious declarations

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against "evil." Evidences of careless language are not hard to find in texts, and a random selection to substantiate this point is quoted below. They may be even more common in lectures, although this is more difficult to document since one has so little occasion to listen to his colleagues' lectures and one's own lectures are without blemish! Quiz questions are also likely to be "contaminated"—probably the most unkind cut of all to students. In short, it appears that, despite our almost unanimous disapproval of teleology and anthropomorphism, they are far from lacking in our instructional material and, I will argue, far from absent from our thinking.

The Usual Excuses

BEFORE reading the evidence, perhaps we should review some of the reasons given by authors and lecturers for their lapses into teleological and similarly "unscientific" language. Commonly, these reasons are accompanied by disclaimers of "evil" intent.

First, there is the argument that the objectionable phraseology is used only to avoid "awkward circumlocution" or "tiresome periphrasis." At least in some instances it can be shown that greater rigor can be achieved without awkwardness, and it is debatable whether rigor should be subordinated to simplicity.

Second, the claim is often made that the objection is purely a terminological one, a mere quibble, and that the words under consideration are as suitable as any others. Here we can only counter with the army claim that "if an order *can* be misunderstood, it *will* be misunderstood." Too often an acrimonious dialogue ensues from which it emerges that "I am more rigorous than thou."

Third, we hear the excuse that vivid writing or intimate lecturing may justifiably sacrifice rigor in the interests of more effective rapport. Since greater rapport is presumed to increase learning, we have the paradox that the students are learning best that which we do not want them to learn.

Fourth, quiz questions, especially on objective quizzes, are said to require directness and brevity; they are to be ques-

tions on course material rather than on ability to read rapidly, and therefore brief teleological or anthropomorphic phrases may be excused "so long as the students know what is required." This interesting philosophy seems to maintain that grades may depend upon students' acceptance of terminology that the professor would condemn if it came from a student. There is also something pernicious in the attitude that rigor is a luxury we cannot afford when something so important as a quiz is in the balance.

Examples of Nonrigorous Language

WITH these excuses in mind (and no doubt others can be adduced), let us look at examples taken from texts and books of the sort recommended for collateral reading. That the majority of examples come from books on biology should give little comfort to physical scientists, inasmuch as more biology books than others were conveniently at hand. Even without a thorough inspection, examples were found in every book examined, whether the subject was biology, chemistry, physics, astronomy, or geology. The quoted examples by no means include all those which were noted.

Rather uncommon are the explicit statements of goal or purpose, perhaps because such statements are not inadvertent but represent a deliberate attempt to produce some (undiscerned) effect:

> It [the universe] emerged full-armed, as it were, out of nothing, apparently for the sole purpose of blazing its way to an eternal death.[1]

> The structures named in quotation marks [root, stems, leaves of stoneworts] are not anatomically like the true roots, stems, leaves and seeds of higher plants, but they do serve similar purposes and show a remarkable degree of differentiation for an alga.[2]

[1] J. W. N. Sullivan, *The Limitations of Science* (New York: Mentor, 1949), p. 26.

[2] G. G. Simpson, C. S. Pittendrigh, L. H. Tiffany, *Life: An Introduction to Biology* (New York: Harcourt, Brace, 1957), p. 498.

Most green algae produce flagellated or amoeboid reproductive cells whose special purpose is to function as gametes.[3]

One purpose of food is to act as fuel for our bodies, supplying us with heat and muscular energy.[4]

Whatever the valley shapes produced in various stages of landscape development, whatever different kinds of rock may be present, the ultimate goal of stream erosion is to reduce the land surface to a nearly flat plain approximately at sea level.[5]

Beware the infinitive form of the verb. In each of the last three quotations it is intimately involved with outright teleology. In more subtle contexts it is the most common producer of teleological implication. From the above statements of "goal . . . is to reduce" or "purpose is to function," we can continue with a graded series of quotations arranged to show that, regrettably often, *to* is merely an abbreviation of *in order to:*

Very little is known concerning these forces, except that they must be considerable in order to overcome the normal repulsion between the positively charged particles in the nucleus.[6]

In combining with other atoms, the atoms of an element *strive to attain the stable arrangement of electrons that characterizes the inert atoms of the elements of Group O.* [italics in the original][7]

Seeds are modified to function as agents in the distribution of the species.[8]

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[3] G. M. Smith, *Cryptogamic Botany, Vol. I, Algae and Fungi* (New York: McGraw-Hill, 1955), p. 22.

[4] K. Krauskopf, *Fundamentals of Physical Science* (New York: McGraw-Hill, 1953), p. 384.

[5] *Ibid.*, p. 510.

[6] A. T. Bawden, *Matter and Energy: A Survey of the Physical Sciences* (New York: Henry Holt, 1957), p. 27.

[7] J. A. Timm, *General Chemistry* (New York: McGraw-Hill, 1944), p. 272.

[8] G. Hardin, *Biology: Its Human Implications* (San Francisco: Freeman, 1954), p. 520.

> Sand grains, pebbles, and boulders are the tools which a stream uses to dig into its bed.[9]

> The ammonia molecule can attach a proton to itself, to form an ammonium ion, NH_4+ . . .[10]

> In this form, each [helix of DNA] will be free to attach to itself nucleotides or their precursors from the environment within the cell, to replace each complementary base that was separated from it in the unwinding and bond breaking.[11]

> Cells of the archesporial tissue (the endothecium) divide and redivide at various angles to form a massive sporogenous tissue.[12]

> Each of these [rotating rings of gas] would condense to form a planet.[13]

Use of the infinitive in the manner of the last two examples is so very prevalent that we must assume that authors, editors, and readers (and lecturers?) consider it unobjectionable and will defend it. Of those who insist the matter is one of far-fetched interpretation ("you're quibbling") we may ask at what point in the graded series they can confidently plan to change a speech habit. And even if they do stop short of undeniable teleology, are they confident that students will do so—that students will not slip into uncritical acceptance of overt as well as subtle teleology? Others may feel that the infinitive in these cases is the most direct and simple mode of expression, and that its avoidance would require "awkward circumlocution." There is a simple remedy, however; substitution of *and* for *to* is quite sufficient in the majority of instances that are not complicated by other infections of animism or anthropomorphism.

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[9] Krauskopf, *op. cit.*, p. 503.

[10] L. Pauling, *College Chemistry* (San Francisco: Freeman, 1954), p. 237.

[11] E. W. Sinnott, L. C. Dunn, T. Dobzhansky, *Principles of Genetics* (New York: McGraw-Hill, 1958), p. 376.

[12] G. M. Smith, *Cryptogamic Botany, Vol. II, Bryophytes and Pteridophytes* (New York: McGraw-Hill, 1955), p. 56.

[13] Sullivan, *op. cit.*, p. 74.

Teleological Thinking

AND IT IS this very point, that generally a mere substitution of *and* for *to* will eliminate the most common examples of teleological phrases, which disclose the real danger behind the use of these phrases in our teaching. The danger is not that we teach "unscientific" terminology but that we are actually thinking teleologically and communicating these modes of thought to students. How else can we interpret the circumstance that, when two sentences differing in but a word can be formulated (compare "hydrogen and oxygen combine *to* form water" with "hydrogen and oxygen combine *and* form water"), we apparently find it easier to formulate the one with teleological overtones? If the alternative formulation appears awkward, it would seem that the awkwardness is not due to circumlocution but to interference with our predilection for certain modes of thought.

To return to the evidences of objectionable expressions in books, let us note another too frequently employed word, *for*. This time the series is arranged to show the more subtle usage first and the overt examples at the end:

> They [insects] have solved the problem of flight, which gives them immense advantages for dispersal, for seeking out appropriate growing places for their young.[14]

> Resting spores of the akinete type, which are structures for tiding the alga over unfavorable periods, usually germinate into a vegetative filament as soon as favorable conditions return.[15]

> In the insectivorous or carnivorous plants, e.g., Venus flytrap, bladderwort, and pitcher-plant, leaves are modified for the capture of insects and other animals.[16]

> There has to be some sort of mechanism for raising sap [in trees], and energy is lavishly expended in the process.[17]

[14] M. Bates, *The Nature of Natural History* (New York: Scribner, 1950), p. 82.

[15] Smith, *op. cit.*, I, 285.

[16] Hardin, *op. cit.*, p. 531.

[17] Simpson, Pittendrigh, and Tiffany, *op. cit.*, p. 139.

> Because of the unique ability of leguminous crops to convert nitrogen—from the soil nitrate or ammonia, or from the air—into bulk protein for feeding animals and other purposes above-ground, and for addition to the stock of organic matter and of plant-available nitrogen in the soil, the crux of food-supply on the modern scale is to render enough of the earthy nutrients, and of lime, phosphate, and potassium especially, available to the legumes.[18]

> In order for growth to occur, materials must be taken from the environment and incorporated into the development body.[19]

SOMETIMES a word with obvious teleological connotation becomes so familiar in limited context that it becomes a conventional term, a quasi-technical word, no longer subject to criticism. One which is almost at that status in biology is *store* and its derivatives. *Store* connotes provision for the future—purposeful accumulation. A better choice is *accumulate* (or its derivatives), since it is noncommital concerning purpose or intent. Although it may be claimed that *store* in the biological sense has a special and irreproachable meaning, it is to be doubted whether students change their understanding of the word when they enter and leave the classroom. Of the next four examples, those combining *store* with *reserve* or *function* are especially likely to lead students astray, but none of the examples would suffer if *accumulate* were substituted:

> [In a description of food chains] Others, the consumers, will be present because, directly or indirectly, they can utilize the food and its energy which is provided by the producers, whether it is an excess they have stored or the producer itself, usually after death.[20]

> Starch is stored by plants in tubers, seeds, and fruits, and a similar substance called *glycogen* is stored by animals in the liver.[21]

[18] H. Nicol, *Microbes and Us* (Pelican Books, 1955), p. 132.

[19] Sinnott, Dunn and Dobzhansky, *op. cit.*, p. 17.

[20] H. J. Oosting, *The Study of Plant Communities* (San Francisco: Freeman, 1956), p. 4.

[21] Krauskopf, *op. cit.*, p. 424.

> In some plants, e.g., *Portulaca* and century plants, the thick leaves function as water storage organs.[22]

> Cells of Dinophyceae store their photosynthetic reserves as starch or as oil.[23]

Somewhat akin to the question of *accumulate* versus *store* is the substitution by many biologists of *interphase* for *resting phase*. Curiously, the objection to *resting phase* as applied to a nucleus has generally been that the nucleus is quite active metabolically during this phase. But, irrespective of whether or not the nucleus is active, the very notion of a nucleus *resting* between divisions should have been considered to be far too anthropomorphic. Yet despite the twofold argument against *resting phase*, this phrase retains some degree of currency, presumably because it is considered a technical expression.

Even if careful biologists are willing to substitute *interphase* for *resting phase* they have no similarly easy choice for various other words which impart more or less technical meanings—for example, *dominance, competition, selection,* and *function*. If not carefully used, such words lose the respectability granted to technical terms and communicate their intrinsic connotations of anthropomorphism, animism, or teleology. This is, I think, apparent in connection with *function* in some of the previous quotations. *Selection,* for which some biologists expect absolution because its unfortunate implications are freely admitted, is hardly innocuous when it is described as entailing a choice by the environment, as in the following:

> *Artificial selection* is a process similar to natural selection, except that the variants that leave the greater progeny are chosen by man rather than by the general environment. [italics in the original][24]

Perhaps these examples from biology textbooks represent merely unfortunate choices of words for concepts which are

[22] Hardin, *op. cit.*, p. 531.

[23] Smith, *op. cit.*, I, 151.

[24] Sinnott, Dunn and Dobzhansky, *op. cit.*, p. 247.

not in themselves unsound. We can hope so, and leave analysis of the concepts to the philosophers of science, since our present concern is with the words per se and their effect on students' thought. But in physics there is used a familiar word which surely must disturb some thoughtful students, and as for the idea it represents, see what Erwin Schrödinger has to say: ". . . the notion of force, the most dangerous relic of animism in this science."[25] "Force," a cornerstone of Newtonian physics, a word and a concept that pervade our language and our thinking—if this is suspect, then what of the vocabulary of the less exact sciences?

Hints at the Supernatural

NOT THE LEAST of the nonrigorous language habits in science teaching is that of implying the activity of a supernatural being. To the beginner, the idea of natural law presupposes a lawgiver, and this extrapolation is confirmed when we state that phenomena occur in obedience to natural laws, or when we imply such obedience by the words *must* or *has to*. For example, in one lecture I declared that an excited electron has to give up the absorbed energy when it returns to a lower energy level. A bright student should have pointed out that the electron doesn't *have to* give up the energy, it just *does*. In like manner, the idea of a planner may be conjured up by the idea of order or plan in the universe, particularly if other words support the inference. Note the mutual reinforcement of *plan* and *constructed:*

> It was he [Copernicus] who revealed to us, in its broad outlines, the plan upon which the Universe is constructed, or at least that part of the Universe which is of most immediate interest to us.[26]

Or, isn't it a sublimation of tendencies toward supernaturalism when nature is personified (deified?):

> For we know, from ordinary observation, how ex-

[25] E. Schrödinger, *What Is Life? and Other Scientific Essays* (New York: Doubleday, 1956), p. 104.

[26] A. Armitage, *The World of Copernicus* (New York: Mentor, 1951), p. 11.

> ceedingly wasteful and haphazard are nature's means of securing her ends.[27]

These hints at the supernatural call to mind the "why" questions, which, admittedly, are often thought-provokers. Not uncommonly these questions do not provoke beginners into causal thinking, and insofar as they tempt students into seeking reasons other than causes, questions such as the following would be more appropriately put to a class in metaphysics than to one in science:

> Why, for example, should the proton have eighteen hundred times the mass of the electron? [28]

> It [Bohr's theory] left unexplained such questions as why an electron preferred a small orbit to a large one, why in its jumps it chose one small orbit in preference to another, why it could not move in other orbits than the discrete ones required by the hypothesis.[29]

It is very easy to explain to the student that "why" in science requires a mechanistic rather than a teleological answer. It is not so easy to get him to adhere to this requirement, especially in biology. Rare indeed is the student who will explain "why a salmon swims upstream" in mechanistic terms. Incidentally, I have found considerable shock value in confronting classes with two questions in succession: (1) Why does a potted plant bend toward a window? (2) Why does a moth fly into a candle flame? At least temporarily the class realizes the advantage of rephrasing with "what causes . . . ," but more than a single device is needed to overcome the continuous beguilement into teleology, animism, and anthropomorphism to which our students are subjected.

I will not attempt to classify the remaining few quoted passages. In addition to the specific words which are objectionable (italics mine), the general tenor of these passages seems unnecessarily nonrigorous:

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[27] Sullivan, *op. cit.*, p. 23.

[28] *Ibid.*, p. 188.

[29] Krauskopf, *op. cit.*, p. 321.

> In Infusoria, where the macro-nucleus normally divides in this *artless* way [amitotically], the micro-nucleus divides mitotically. The whole process of mitosis is an elaborate way of *ensuring* that the genes which are localized in the chromosomes shall be exactly distributed among the daughter nuclei.[30]

> Obviously blood *must not* clot inside the blood vessels, *as it would block the circulation. . . .*[31]

> As the temperature increases the molecules become more and more agitated; each one bounds back and forth more and more vigorously in the little space left *for it* by its neighbors, and each one strikes its neighbors more and more strongly as it rebounds from them.[32]

> *So eager* are sodium atoms *to lose* electrons, *so anxious* are Cl atoms *to receive* them, that the combination is extremely violent, accompanied by the evolution of much heat and light.[33]

But why worry about it? Few of us would offer a brief in support of teleological language, but can't we be tolerant of occasional contaminations? Must our language be made aseptic? I maintain that we should try, and this means giving more than lip service to the attempt. Lip service is not merely insincerity; it may lead to unjustified feelings of security. In one of his expositions of operationalism Bridgman makes a point that applies here. He says, "The true meaning of a term is to be found by observing what a man does with it, not what he says about it."[34] So also, though we *say* we are against teleology and all the rest, we *use* these ideas in our language and thereby display the extent to which they affect our thinking.

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[30] H. Kalmus, in collaboration with Lettice M. Crump, *Genetics* (Pelican Books, 1948), p. 69.

[31] *Ibid.*, p. 145.

[32] Pauling, *op. cit.*, p. 44.

[33] Krauskopf, *op. cit.*, p. 335.

[34] P. W. Bridgman, *The Logic of Modern Physics* (New York: Macmillan, 1927).

Suggested Remedies

WHAT CAN we do about it?—other than be more careful, that is. Carefulness is a rather passive approach; it may protect students from being led astray, but it is hardly likely to teach them to avoid the pitfalls consciously. If a little class time can be devoted to the problem, it can be a rewarding topic, not only for its own sake, but for its reinforcement of other topics. The following active approaches have been used in a large class (400 students) to sufficient advantage to encourage further attempts. First, we presented justification for our avoidance of the teleological, animistic, and anthropomorphic viewpoints, as follows:

(1) When mechanistic explanations are available, teleology and its allies violate the principle of parsimony. (Pointing this out is one of the easiest means of elucidating the application of Occam's razor.)

(2) Teleological and similar elements of explanations are probably never heuristic in the natural sciences. (We used this point to reinforce discussion of the criteria of a good theory.)

(3) Questions formulated in teleological and similar styles are "meaningless" in the sense that they are not susceptible of scientific investigation, whereas restatement in rigorously mechanistic or operational terms will often indicate the means of attacking the problem. (Substitute *what causes* in questions that begin with *why*.)

To pursue this active approach, we attacked textbook statements, some of which are quoted in this article. Sometimes passages were dissected in class; others appeared in examination questions. This was disconcerting to some students, who found it unorthodox to challenge the printed word. Since rejection of the method of authority is often taught as a feature of the scientific attitude, we feel that the technique was valuable.

It is realized that some will consider such techniques to be distractions from what the author or lecturer is trying to teach. Indeed, the whole matter may be dismissed as a dis-

proportionate concern with words at the expense of course content. But what is the lecturer trying to teach? What should be the content of science courses which, usually, purport to satisfy the objectives of a liberal-arts curriculum? In view of the differences between the traditional content of physics and chemistry and biology, it seems unreasonable to claim that these different contents are equivalent for satisfying liberal-arts requirements. Rather, we should reexamine one of the platitudes—"teach them how to think." If this is what the lecturer hopes to teach, then an occasional distraction from the factual material is not only justified, it is essential.

IN SEARCH OF "BEAUTY": A Panel Discussion

RUSSELL W. LEMBKE *

Offered with apologies to estheticians, dead and alive: Socrates, Plato, Theocritus, Homer, Ovid, Augustine, Parker, Nietzsche, Lange, Santayana, Croce, Bergson, Maritain, Bell, Carpenter, Fry, Ortega, Lee, Bullough, Puffer, Morris, Whitehead, Mumford, Rader, Prall, Ogden, and Spengler—in the order of their appearance.

EMCEE: Hello, there, Earth! This is your peripatetic MC coming to you remote by space station from Other World I. It's your One Universe Conversation Hour. Tonight our subject is "Beauty." There's a to-do on Earth, a great search afoot to find a mathematical formula for beauty. You'll hear the former Greats of Earth set us straight tonight. I'm surrounded here by esthetic souls—artists, critics, philosophers, and souls who still . . . "know what they like." (Laughter.) You gentlemen here . . . Sirs, will you tell our Earth listeners what beauty is?

SOCRA: A short-lived tyranny.

PLATO: A privilege of nature.

THEOC: A delightful prejudice.

HOMER: A glorious gift of nature.

OVID: A favor bestowed by the gods.

AUGUS: O God! O Beauty of all things beautiful!

EMCEE: Your words have a familiar ring. Can we be specific? I have a friend on Earth who operates a digital

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robot named LUNIAC; he won't know what to do with your suggestions.

PARKE: Well, Beautiful Art is like a happily organized life. The forms of the Good and the Beautiful are the same. The human *Will* is the motivator.

NIETZ: "Good and Beautiful," indeed! Say "Yea!" to life with Dionysus—find a dream world of harmony with Apollo. Either way, art is more *useful* than your LUNIAC.

EMCEE: What does art do to be useful, Sir?

NIETZ: Do? Do! It praises, glorifies, selects, brings to prominence. . . .

LANGE: High and mighty talk! The child's "let's play like," the reality of a little girl's doll—that's art. Mature play and art stand halfway between belief and unbelief.

SANTA: . . . genesis, my friend!—hardly helpful.

EMCEE: What is beauty, Sir?

SANTA: To which of three kinds do you refer: Sensuous, Formal, or Expressive?

CROCE: Santy's a hedonist. For him there is a special *Esthetic Pleasure*.

EMCEE: You, Sir, . . . What *is* beauty?

CROCE: It's what the other fellow misses when he looks at a flower. But we can all find the missing, the synonymous ingredients—imagination, intuition, expression, form. The Artist—with a capital "A"—sees and expresses more clearly than the rest of us.

BERGS: Comedy is a special case—in comedy the Intellect dominates.

MARIT: Contemplation, Sir, counts in all art. Joy is the correspondence of Mind and Object. The first constituent of Beauty is Form—not bare design, mind you, but a revelation of principles: tragedy reveals the *meaning* of death. Clear and delightful Meaning must shine forth in Unity that appeals alike to the senses *and* to intelligence.

BELL: I say . . . I say it is Form . . . alone!—*Significant* Form. (Laughter.)

CARPE: But you, my friend, cast out experience, and only in experience is there significance.

FRY: I say there's an exclusive *Esthetic Emotion.* In Music—the ideal art—form most completely absorbs matter.

CARPE: You, too, isolate Form from Life, Sir. A *line* is a part of form *and* of life. Out of Form and Representation arises a New Thing: an *Artistic Emotion.* Abstract painting distorts the relation! (There's a hubbub of objection among the younger souls.)

BELL: *How much* of art is Reality; how much, Form?

ORTEG: "Reality"! . . . My dear fellow! *Dehumanize* art! *Increase* Detachment! Look down there on Earth! Look at the romantic, sentimental claptrap that passes for art!

EMCEE: My friends who tend LUNIAC's and VERIWAC's. . . .

ORTEG: Deform the real—derealize, yes. But esthetic pleasure has nothing to do with automata . . . nor with caprice —neat, pretty, or silly! The artist *stylizes* what he sees. Only the superior man, the intellectual aristocrat, recognizes the spiritual quality of art.

LEE: No, no! We must empathize—we must *feel in* the object of art.

BULLO: I would say, rather, *Decrease* Detachment. . . .

PUFF: *Equilibrium*—the balance of forces: the excursion from the center and return leads us to self-completeness.

* YNONA: But . . . but . . . "Beauty is truth; truth is . . ."

MARIT: . . . *sub ratione delectabilis.* . . . (He mutters on.)

BULLO: *Antinomy of Distance* is the master principle.

* ANONY: I had a beautiful garden . . . I had music and pictures in my Earth home. But you are. . . .

MORRI: Good for you! You *possessed* art. Such homes outweigh all of the art galleries and concerts of the Universe.

WHITE: In my time, industry began to cultivate the capacity to see values vividly. Once we filled our minds with thoughts of *Things* to the exclusion of *Values,* but. . . .

MUMFO: Earth's in an electric-alloy stage, approaching a clean, new phase wherein machines enrich art and art humanizes the machine.

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* YNONA: Anonymous, female; ANONY: Anonymous, male.

ORTEG: (Snorting.) Humaniz—!

MARIT: The machine, always the machine!—*id quod visum placet:* the beautiful gives pleasure on sight. . . .

RADER: "Value" is the word—art expresses values. Earth men should isolate values. And it's the *search* for values that matters.

PRALL: True enough. The artist seeks not the beautiful but whatever serves to express the *qualitative* nature of the values that he thinks important.

MARIT: . . . *claritas est de ratione pulchritudinis.* . . .

OMNIUM-GATHERUM: I'm for old-fashioned virtues and beauties.

Beauty is an *Absolute*—a fixed essence, the evidence of genius.

No, no! Beauty is *Relative.* . . .

Beauty is Relative to *Standards.* . . .

ANONY: Who sets the "standards"?

RADER: Critics . . . estheticians. . . .

ANONY: Huh? . . . These fellows here?

YNONA: "A thing of beauty is a joy forever. . . ."

MARIT: . . . *lux pulchrificat . . . splendor ordinis.* . . .

PUFF: Equilibrium.

OGDEN: Synesthesis.

MARIT: Contemplation.

CARPE: Artistic Emotion.

CROCE: Esthetic Pleasure.

ORTEG: (Climactically.) Dehumanization!

MARIT: (Still muttering.) . . . *splendor formae.* . . .

SPENG: (Topping them with fervor.) All this talk is civilized nonsense and academic chit-chat. Earth's culture has run its course—like a plant that grows, flourishes, decays. Civilization is a stage of senility and decay, a condition that produces *no* Beauty! (Hubbub.)

EMCEE: Yes! Yes. . . . Please. Thank you . . . thank you, ladies and gentlemen! Our . . . our time is up, un . . . fortunately. This has been One Universe. Ah . . . we return you now . . . to Earth.

• DISCUSSION •

THE HUSBANDS IN MY LIFE

MARY GRAHAM LUND *

A GREEK named Heraclitus claimed that you never see the same river twice because the water that was there one minute is not there the next. In this respect, it seems to me, husbands are like rivers. For example, my husband Tom.

Tom_1 is of course the lover; Tom_2, the man of business. Both these Toms are substantially the same today as when we were married in 1948.

Tom_3, the father, is different. He wasn't born until 1950. I watched his birth with some pity, a little resentment, and a strong upsurge of motherly feeling toward him. He was almost as bewildered as was Tom, Jr. But, whereas the baby took strong hold in his new world, Tom_3 stood at the edge of fatherhood for a while, until I felt like taking him by the ear with an old-fashioned motherly grip and leading him to his son. Today, though, Tom_3 bears little resemblance to $Tom_{3\ (1950)}$. Actually, I feel a little shut out now when Tom_3 and Tom, Jr. are especially close, as when they're planning a fishing trip.

Tom_4, the fisherman, is a loathsome person—an adolescent, self-centered, unpredictable, thoughtless, utterly selfish braggart. Yesterday, he bought Junior a fishing rod.

"Pampering him," I said. "He needs other things so much more—his teeth straightened, summer camp."

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* Mrs. Lund, of Los Angeles, has contributed to the *University of Kansas City Review, Southwest Review, The Humanist, Arizona Quarterly* and others. Her article is reprinted by permission from *Minutes: Magazine of Nationwide Insurance.*

The author is indebted to Dr. Baxter Geeting, of Sacramento State College, for whose class in semantics this paper was originally written.

"He needs a fishing rod." Tom_4 said.

"You're teaching him to become a thoughtless husband," I charged.

"Oh, I don't know," Tom_4 said. "Maybe he'll marry a girl who likes to fish."

That stopped me for a minute. I'd never thought of there being such girls. Perhaps Tom_4 was disappointed in me. I was just wondering what I could wear on a fishing trip when Tom_4 shattered my good intentions by saying, "A fishing trip for Junior is a good deal more important than a permanent for Nancy."

THIS CAME as a surprise. Tom_{3b} as father of Nancy was not the Tom_{3a} father of Junior. Usually Nancy could get away with anything. At five, she had known better than to cut up the evening paper before her father had seen it, but Tom_{3b} had just laughed. He was certainly no relation to the husband-at-breakfast Tom who would scream if his wife got the pages of the morning paper out of place. He'd always been a little too indulgent with Nancy and too severe with Junior, but now he was begrudging Nancy a permanent.

"Do you want to have an unattractive daughter?" I asked, but Tom_{3b} wasn't there. Tom_5, the amateur plumber and ardent do-it-yourselfer, had taken over. He was at the sink fussing with the garbage disposer, promising to fix it Saturday.

"Why don't you buy Nancy a fishing rod?" I suggested.

And who looked back at me? Tom_6 the bewildered husband. "Are you joking?" he asked.

"Certainly not," I said indignantly. "You should train her to make a good wife."

Tom_6 laughed. Then Tom_7 took over. Tom_7 is the appreciative husband. He's a very determined fellow. He laughs loud and long.

"Very funny," he said. "I always appreciate your sense of humor. I always tell my—"

"Don't overdo it," I snarled. "I'm not being funny. Maybe she should have a fishing rod."

"She has her permanent," Tom_8 said with a laugh. "When

she gets a little older she can fish with that." Tom_8 is a clown, the life of the party. Some day I may murder him.

I poured the coffee and resisted the temptation to drip a little on Tom_8's balding head. "Polygamy's wonderful," I murmured with a sigh, as I set the coffee pot down.

Tom_7 looked at me with concern. "Have you seen your doctor lately?" he asked.

"No, there are enough men in my life," I answered. But Tom_2 was looking at his watch. I realized that my remark had been wasted. Not one of my husbands was listening.

A RECONSIDERATION OF LABELS IN PENOLOGY

C. J. BECK *

I AM SURE that some of your readers are concerned with correctional matters. It has long been my feeling that we in correctional work could profit from a critical re-examination of our treatment goals and our manner of thinking about those often used and seldom defined penological terms, *recidivism, criminal, criminality,* and, most important, that fuzzy dichotomy, *success* and *failure.*

According to an extremely unreliable source, Chinese physicians once received their payments only when the patient was in good health. Under such conditions the concept of *medicality* might develop and flourish. The sick might, under these circumstances, be termed *medicals* and around those repeatedly ill there might grow up a body of literature concerned with medical recidivism. Theories regarding *medicality* might blossom and flourish. *Medicality* would then be explained in terms of emotional disorder, inherited defect, or environmental influence.

Under such circumstances a successful appendectomy followed a year later by a kidney condition would label the first

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operation a failure—the physician had failed to "cure" the *medical,* and *medicality* had set in.

Today, modern penology is to great extent judged, and judges itself, its successes and failures, in this hypercritical manner. Few professions have tied themselves so firmly to such an outmoded and unscientific appraisal of its therapeutic efforts.

The penologist faces a client who for one or several reasons has been termed a *criminal,* a violator of the criminal law. Meeting this *criminal* individual the penologist must, if he is to be termed successful, not only solve the client's immediate problems but extend at least a semi-promise to society that he will somehow also solve his *future* problems whatever they may be and no matter what conditions or situations may bring these problems about.

I HAVE on my desk at this time the case history of a typical "recidivist." In 1955, when he was 17, this unfortunate individual was unlucky enough to have been seduced by a worldly young woman with an ill-tempered mother. The girl's chronological age was 17.89 years, a clear case of vicious statutory rape according to law. Some doubt still lingers in my mind concerning factor and factee in the performance of this particular criminal drama.

Now, four years later, this individual is back with us convicted of the crime of *Larceny of a motor vehicle.* Overwhelmingly, the local welfare agency, county attorney, and friends and relatives of the incarcerated, belabor the "fact" that he obviously was never "rehabilitated" and now that he is a "recidivist" probably never will be of any account to society.

If this all-encompassing definition of recidivism were restricted to lay-people one might pass it off as lack of knowledge or simply poor public relations on our part, but even the experts uncritically accept this viewpoint. A no less eminent authority on crime than Sheldon Glueck sees 78 per cent recidivism in the fact that 78 per cent of a group under investigation committed *another* crime within the five years fol-

lowing release.[1] Glueck concludes from these data that these institutions are not materially reducing recidivism.

Walter C. Reckless, in his fine study of crime and corrections, regards all those individuals previously known to the court as recidivists.[2]

Apparently the problem is one of redefining what "success," or "failure," consists of in correctional practice. Penologists must come to see themselves as treating a multiplicity of behavior*s* rather than treating the fictitious behavior called criminality. Just as there is no treatment for disease, but only treatments for diseases, there appears to be no treatment for criminality, only treatments for criminal behaviors.

To further complicate the penologist's therapeutic efforts he is dealing with a client badly labeled by his "treatment" situation, the stigma of which might make "recidivists" of many otherwise non-criminal individuals in our population.

Even in its present infancy penology has little difficulty arriving at approximate clinical diagnoses and treatment needs. While institutional retardation too often makes appropriate treatment difficult to impossible, enough can be done to make an adequate survey of results in selected cases if "success" or "failure" is judged on the basis of causes of the new crime (if perpetrated) rather than upon the mere fact of undifferentiated *criminal* behavior.

Such tabulations would show the categories *treatment failure*—where the same unsolved problems created the new criminal behavior, and *treatment success*—where either no new criminal behavior occurred *or* where criminal behavior stemmed from new problems which arose as the changing individual interacted with himself and with others.

Such revised criteria might aid present treatment efforts by focusing attention upon the on-going, changing, individual. The courts might use habitual criminal statutes more cautiously with the realization that $crime_1$ is not $crime_2$. Parole boards,

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[1] Sheldon Glueck, *Crime and Justice* (Cambridge: Harvard University Press, 1945).

[2] Walter C. Reckless, *The Crime Problem.* (New York: Appleton-Century-Crofts, Inc., 1950).

usually less eager to grant parole to recidivists, might see more clearly the differences which make the difference.

Penologists might even rest nights when freed from the verbally induced compulsion to predict the entire future of their clientele.

WAR GAMES

CRAIG R. EISENDRATH *

DURING my recent tour of duty with the 25th Infantry Division at Schofield Barracks, Hawaii, I was one of many thousands of men whose lives were disrupted by a brief period of military service. Throughout this experience, I was struck by the passion for games and by the flights into the fanciful and the illusory among my companions. It became increasingly clear to me that their conception of the "real world" and the relationship between this conception and their language had radically changed.

My time of service with the Division was unmarked by any military engagements. The rank and file of the troops did not anticipate any military action. The Division experienced hard work, however, in garrison class exercises and it solved field problems in which the men would assault hills, maneuver with their guns and tanks, and test their communications and artillery. For the two- and three-year men, who did not foresee combat within the period of their enlistment, this training was at most a matter of perfecting some skills, similar in nature to situations in which one tries to achieve proficiency in tennis or bowling. At worst, it was a bit of foolishness or a comedy to be played out.

The phrase "war games" was a cliché used by the short-term soldiers to describe their training. Returning to the garrison from a field problem, they would respond to the ques-

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tion as to what they had been doing with, "We just played some war games." So prevalent was this sort of feeling that even the official 25th Infantry Division newspaper, the *Hawaii-Lightning News,* made frequent use of the term. Had war been imminent, it would probably never have been used by the paper. What made the maneuvers a "game" was the feeling that the situation for which the men were preparing would not occur.

Consequently, the training ceased to be preparation for practical activity in a "real world" and became a kind of game, in which certain skills were developed and limited ends were pursued. In a game, one preserves a certain psychological distance from the exigencies of life in the "real world." Furthermore, a game gets part of its character from the fact that it proceeds according to given rules. They give the several game activities significance. In the "real world," when a tennis ball falls on one side of a boundary, the event has perhaps only a certain spatio-temporal or mechanical meaning. But "in tennis"—that is, in the game situation—the object is to hit the ball within the chalk lines. When it falls outside of the lines, it is "out of bounds." The phrase "out of bounds" denotes a certain value within the context of the game.

IN BASIC TRAINING, the infiltration course was an occasion of much fear for some men. While machine guns fired overhead, they had to crawl under barbed wire for a distance of fifty to one hundred yards. Once they realized that the machine guns were firing at forty-four inches above the ground and that unless they stood up they would not be hit, their fear disappeared. As one of them put it, "As long as you play the game, no sweat." This sense for the rules of the game and for the values which derive from abiding by the rules exhibited itself in other areas of army life. If a soldier was summoned by his company commander to account for some infraction of regulations, often he could escape punishment by "playing the game." This meant knocking at the officer's door, giving a snappy salute, and standing at rigid parade rest during the course of the interview. In a case like this, playing

the game in conformity to the rules frequently secured for the player a value he desired. Throughout the context of the military situation, "playing the game" in such a manner was found to be a value-producing activity, even though the whole complex of behavior was divorced from what the individuals involved considered the "real world."

The use of "game" terms was, of course, much more common among enlisted men than it was among career officers. In the group of enlisted men, the incidence of usage was higher among those who had never seen combat than it was among veterans of World War II or of the Korean War. For the two- and three-year men, military training was synonymous with "war games." For them, the "real world" was the civilian context of life, which they had been forced to abandon for a short time. Their use of the term "war games" also signified a depreciation of military training relative to the "real world" of practical activity. In some respects they conceived themselves to be functioning in a context of recreation, though the knowledge that they were forced to abandon the "real world" continued to shadow their thoughts and actions.

WHEN ONE PLAYS a game, he must realize that a special set of rules or determinants is operative or else considerable confusion will result. For example, some Negroes in my barracks played a game in which the rules dictated that they insult as dexterously and severely as possible the parents of their companions. Although I did not personally observe this game played among groups other than Negroes, several former servicemen have reported to me that they saw the game played among men whom they termed "hillbillies." Since the volleys of insult were a game, the language used was not interpreted in a literal or ordinary fashion. Had an ordinary interpretation been made of the terms employed, the resentment aroused would have resulted in violent conflict. The winner of the game was he whose language, if true under a literal interpretation, would describe the other men's parents as the worst. Military training likewise is evaluated by how effectively troops will perform, if it is true that there is a war. Both cases are

marked by reference to a "real world" as an idea entertained. In so far, however, as one plays his role in the game he is rewarded by certain values. In the "game of insults," these values were perhaps those of prestige, social acceptance and approval, friendship, and delight. Some Caucasians who were unfamiliar with this particular game were severely critical of those who played it. One said, "How can they talk about their parents that way? Boy, if someone ever said that about my mother, he'd pick himself off the floor. . . . That's what I've always said, those people haven't got any pride." I invested over an hour in patient explanation to him of the nature and rules of the game. He was only partially reconciled to the situation.

Among two- and three-year men in the army, the term "short-timer" is very popular. A "short-timer" is someone who has very little time left in his tour of service. Prison slang is probably the source of the term. In the "short-timer's game" the object is to describe yourself as "shorter" than your fellow-players. One says, "I'm so short that my Bermudas come down to my shoe tops." Another responds, "I'm getting so short I'm afraid to go to coffee call for fear of missing the boat." The interchange goes on in this manner. As in the cases of the "war games" and the "game of insults," there is a reference to a suspended "real world." This game is also a source of values. Here some of the benefits are those of the pleasures of humor, sarcasm, or anachronism. Moreover, by describing themselves in the anomalous phrases of the game, the men engage in wishful thinking, which has its pleasures, and is a competition in mental ingenuity. The ingenuity is mental, not merely verbal. The chief source of pleasure is in the communication of striking preverbal imagery, conceptions, and feelings. A lesser object is the display of clever language employed to illustrate them.

GAMES were also built on the themes of what the men would do to sergeants they disliked or to reenlistment sergeants who would try to entice them again into military service after their separation. In other instances, a soldier would say, "Hop

into my Jaguar," when you were climbing into his jeep. A former law student working as a file clerk would imagine himself as a practicing attorney and use the phraseology of the legal profession. Much of the mental activity in the peacetime army is of this kind. It is based on the soldier's feeling that army life is not the "real world." Suspended for two or three years in a world he does not consider "real," his thoughts and feelings carry him into a world he once knew or a world which will never exist. While frequently he works hard in this realm which he considers to be unreal, he conceives himself as playing a role or playing a game.

The "war games," the "short-timer's game," and other such types of play, with their attendant illusions, do not characterize the mental activity of the career officers and sergeants. For them, army life is the "real world." As career men, they find their ultimate goals within the matrix of military establishments and procedures. Life's major crises and decisions appear in the military context. There is nothing illusory or playful about it. The short-term men, however, think of civilian life as the only "real world"—army life is a game. The difference between the two groups is perhaps that between professional baseball players, umpires, or physical education instructors and the occasional Sunday afternoon athlete.

PART of the adjustment problem of the short-term soldier is that of once again establishing himself in the "real world" of civilian life, to which his language in the games referred as remote and unrealized. Again he must discover that a literal or ordinary interpretation of language is relevant and useful in this world. The atmosphere and spirit of the games and illusions which preoccupied him in the army must now be displaced to the tennis courts, chess boards, or television screens. The readjustment of the relationships between language, the "real world," and the "world of games" is often an arduous and trying experience. In effect, it constitutes a reconstruction of the self.

"SHADE-TOLERANCE": A SEMANTIC ANALYSIS

JOHN P. DECKER *

THE SILVICAL concept shade-tolerance has been confused and at times even polemic.[1] That the confusion has been a barrier to productive research was indicated eloquently by Baker [2] in a paper that is exemplary for humility and subtle humor. Most difficulties arose from unrecognized linguistic problems rather than from problems of tree behavior.[3] The developmental pattern of the major linguistic problem involved is common to many terms in many disciplines: coin a useful adjective, shift to an abstract noun, extend the noun beyond operational definition.

"Shade-tolerant" is a sound and useful technical adjective. Only a few will misunderstand a statement "western redcedar is shade-tolerant, that is, if one looks at old and undisturbed forests on mesic sites within its natural range, he will often see several age classes of redcedar reproduction established under closed canopies."

In shifting to an abstract noun the statement may become "western redcedar shows shade-tolerance." This statement adds no further information, it is simply a restatement. It engenders no difficulty when it denotes "because redcedar appears and acts in certain ways, I will label it as being shade-tolerant or as showing shade-tolerance." It misleads when it fosters a question "what is shade-tolerance, itself?" The "itself" directs attention to the symbol as something apart from

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[1] H. L. Shirley, "Is Tolerance the Capacity to Endure Shade?" *Journal of Forestry*, XLI (1943), 339-345.

[2] F. S. Baker, "Effects of Shade upon Coniferous Seedlings Grown in Nutrient Solutions," *Journal of Forestry*, XLIII (1945), 428-435.

[3] J. P. Decker, "Tolerance is a Good Technical Term," *Journal of Forestry*, L (1952), 40-41.

the situation symbolized, and the question is nonsense.

The statement misleads also when "shade-tolerance" implies a basic single property of which any given set of observable properties are only partial and outward manifestations. In the statement "foresters have long sought the cause of tolerance, but with no conspicuous success" [4] and "the physiological basis of shade-tolerance, however, is not well understood," [5] shade-tolerance is treated as a single property with a single cause or basis. There may be an explainable physiological cause for each definitive action of a shade-tolerant tree, but there is no reason to assume that any given cause is common to all or even to any two actions.

A statement such as "the shade-tolerance of a tree determines its growth characteristics" is completely circular. Because a tree has certain growth characteristics, we label it as having shade-tolerance. Substituting this definition in the statement, we arrive at "the growth characteristics of a tree determines its growth characteristics." In such usage "shade-tolerance" has become a panchreston or explain-all and an effective barrier to analytical thinking. Hardin [6] has stated the case against panchrestons very lucidly, and no attempt will be made here to repeat or add to his discussion.

I CONCUR with Shirley in his recommendation that "shade-tolerant" and "shade-tolerance" should replace "tolerant" and "tolerance" in our technical usage; but the concurrence is based on entirely different reasons. The usage he recommended is still pseudo-analytical. He objected to one panchreston and proposed to substitute another for it, whereas the real confusion results from using any panchreston.

My objection to "tolerant" and "tolerance" is that, as we foresters use them, these terms are technical jargon but are not easily identified as such by non-specialists in the field.

[4] F. S. Baker, *Principles of Silviculture* (New York: McGraw-Hill, 1950).

[5] H. J. Lutz, "Applications of Ecology in Forest Management," *Ecology*, XXXVIII (1957), 46-49.

[6] Garrett Hardin, "Meaninglessness of the Word 'Protoplasm.'" *ETC.*, XIII (1956), 193-208; "The Threat of Clarity," *American Journal of Psychiatry*, CXIV (1943), 392-396.

The terms can be confused easily with their identical homonyms of everyday language, and clarity of both languages is thus impaired. To label our jargon clearly, we probably should use the expressions "shade-tolerant" and "shade-tolerance." Shade, in this context, symbolizes broadly the situation found under forest canopies. Reduced light intensity is only the most conspicuous component of that situation. Not all other components have been identified, and not all effects on plant growth have been evaluated, and the term is valueless for analysis, but this fact does not impair descriptive usefulness.

HOLLOW ON THE OUTSIDE

PAUL L. LATHAM *

A SUIT for infringement of a patent on a "Feather-Picking Apparatus for Fowls and the Like" elicited a generally semantical reaction from a U.S. Court of Appeals in Priebe & Sons Co. v. Hunt, 188 F.2d 880. The apparatus consists of a drum mounted in a frame and driven by an electric motor. Flexible fingers extend from the surface of the drum. Some of the claims in the patent application recite that the fingers are hollow, others are silent on this point. The specifications in the application recite that solid fingers will remove feathers but hollow fingers will remove them faster. Usually the claims in the application define the limit of protection granted by the patent issued on them.

To use the invention, the operator first dips a fowl (or the like) in hot water and then holds it against the fingers projecting from the revolving drum, turning the fowl so that all parts of its body come in contact with the fingers on the revolving drum. The machine will remove all feathers in 8 or 10 seconds, doing a much faster and more thorough job than

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human fingers can do. This is the first successful mechanical chicken-picker. The court found that the only "prior art" consists of "paper" patents, i.e., patents for machines that either were never built or were never operated in accordance with the patent disclosures. (The word is not the thing, you see.) Being operationally the first in the field and not merely an improvement, this chicken-picker constitutes a "pioneer" patent and as such "is entitled to a broad and liberal construction and to a broad and liberal range of equivalence and is not to be limited to the precise device and instrumentality disclosed."

The piquancy of the following observation of the court stands undiminished by an ultimate finding that hollowness is not an essential of the patent:

> It is strenuously argued that the accused devices do not infringe because the fingers on those are not hollow. This argument assumes that the fingers used by the defendant are solid. The finger used in the Albright device is a trough-like structure, while the finger used in the Johnson device is cut away at the back. Each of these fingers in a sense at least is hollowed on the outside. Part of the material in these devices is cut away. In the hollow finger the cut is on the inside and in the other finger the cut is on the outside. Even in patent law, substance is more important than form and should control over mere words.

HOLLOW on the outside. Maybe this isn't such a joke after all. Perhaps we have here an instance of a court of law finding a valid new geometry such as Korzybski used to talk about, turning an object inside out to look at the relations of its parts. In other words, the court found a persistence of relations after transformation. If the perception of the court seems at first slightly ludicrous, a reason for its seeming so may be that it was not presented in a systematic formulation such as general semantics provides. Many insights are thus wasted for time-binding. A familiarity with general semantics might make many lawyers and judges more creative and effective and aware of what they are doing.

• BOOK REVIEWS •

Principles for Scientific Practice

THE LOGIC OF SCIENTIFIC DISCOVERY, by Karl R. Popper. New York: Basic Books, Inc., 1959. 480 pp. $7.50.

I

THE DISTINGUISHED professor of logic and scientific method at the University of London, Karl R. Popper, brings to us in English text his *Logik der Forschung* (1934). He is widely known as the author of *The Open Society and Its Enemies* and of many articles in scholarly journals. We have the fortunate circumstance of a translator who knows exactly what the original writer wanted to say and who can say it well in English. Popper acts as his own translator. The result is a lucid, smooth, and lively discussion of even the most technical problems in scientific inquiry. After twenty-five years the *Logik* is still stimulating and relevant, surpassing in penetration and argument most of the books which have since appeared in the field. To the English text of the *Logik* (279 pages) Popper has added 155 new pages of appendices in order to bring his reflections on science down to date.

In the Preface to this English edition, the author challenges the language analysts on their contention either that there are no genuine philosophical problems or that the problems of philosophy are issues as to the meanings of words. The problem of cosmology—that of understanding the world, including ourselves and our knowledge—is a genuine one which interests all thinking men, he argues. Moreover, science is cosmology, properly understood. In studying the growth of scientific knowledge, the growth of knowledge in general may best be seen and analyzed. Those who confine themselves

to analyzing ordinary knowledge or language are consequently shut off from the most important and exciting problems. The "new way of words" among the language analysts turns out to be at least as narrow and sterile as "the new way of ideas" used by Locke, Berkeley, and Hume. The body of the *Logik* and its appendices give the victory to the challenger.

II

POPPER'S logical analysis of the methods of the empirical sciences wastes no time in playful preliminaries. On the first page he plunges into one of the hard, nuclear problems of modern science: the problem of induction, that is, the problem as to when in observing and counting black crows we are justified in asserting that all crows are black. As Bertrand Russell observed in *A History of Western Philosophy* (New York: Simon and Schuster, 1945), "the problem of induction by simple enumeration remains unsolved to this day. . . . Neither Bacon nor any of his successors have found a way out of [this unsatisfactory situation]" (p. 545). After an extended discussion of Hume's method, Russell concludes, however, that "induction is an independent logical principle, incapable of being inferred either from experience or from other logical principles, and that without this principle science is impossible" (p. 674). An earlier discourse by Russell indicated that he had some serious reservations about inductive logic and inductive inferences. One of the notes in *The Principles of Mathematics* (2d ed.; W. W. Norton: New York, 1937) commented that "what is called induction appears to me to be either disguised deduction or a mere method of making plausible guesses" (p. 11). Popper openly and effectively contests the popular opinion that the empirical sciences can use or do use inductive inferences. The chief ground of his challenge is, of course, the indubitable contention that it is logically fallacious to infer universal statements, which are the fabric of scientific theories, from singular statements. Any principle of induction by which such inferences could be established would itself be either analytical or synthetic. If it were analytical (which is not the case), there

would be no problem of induction to begin with. Were it synthetic, then, since it is also universal, we would have the same problem in establishing the principle as in justifying the inductive inferences it is supposed to warrant. This leads to an infinite regress of such a character as cannot resolve the problem. This situation is not rectified, even if inductive inferences are construed as probable rather than certain. Inductive logic and inductive inferences are consequently excised from empirical science by the author. Some other logic and some other method characterize science. Contrary to Russell's recent opinion, Popper believes that science is possible without a principle of induction.

THE CONVENTIONAL books on the logic of scientific method discuss observation and classification, verification of hypotheses, statistical techniques, and J. S. Mill's canons for inquiry. Almost invariably they sound far removed from what actually goes on in research or in engineering laboratories. This artificial atmosphere does not hang over Popper's exposition, even when the going gets difficult. The authentic method of science—which is generally used, even when the investigators continue their obfuscating talk about induction—is the deductive method of testing. This means that a scientific hypothesis can only be empirically *tested* (not *justified* or *verified*), and the tests can only be applied after the hypothesis has been advanced. From a new idea or a theoretical system, conclusions are deduced. Through these lower level assertions implied by the theory, it is tested (a) for logical consistency, (b) by determining whether the theory is tautological or empirical, (c) by assessing its relevance or significance, and (d) for empirical applicability. Popper's lucid and convincing argument shows that a theory can never be completely established but it can be definitively rejected. The conclusive rejection is, of course, that established by *modus tollens,* the inference from the falsity of a conclusion to the falsity of the premisses which imply it.

This logically secure inference among scientific propositions, namely, the falsification of a theory, is the chief clue which leads Popper to one of his central themes: the

problem of demarcation. This is a question of where to draw the line of distinction between empirical systems and other systems, such as logico-mathematical ones or metaphysical ones. Opposing the positivist's emphasis on verifiability, Popper adopts the convention of falsifiability to fix the line of demarcation. "It must be possible for an empirical system to be refuted by experience" (p. 41). The deductive method of testing brings us eventually to basic statements. A basic statement is a statement of a singular fact and it can serve as a premiss in the process of falsification. While it is a statement of fact, it is not justified by fact—only statements justify statements. The author indicates that these basic statements are nevertheless inter-subjectively testable. One does not verify or justify even these basic statements on the basis of sense experience. Regardless of their level of generality, scientific statements or theories are never finally established. They can, however, be conclusively rejected. Science is an open-ended process of inquiry.

THE DISTINGUISHING mark of empirical statements is their susceptibility to revision. "If you insist on strict proof (or strict disproof) in the empirical sciences, you will never benefit from experience, and never learn from it how wrong you are" (p. 50). Popper regards methodological rules in science as conventions. Examples of such postulates are: (1) The game of science is, in principle, without end. (2) A tested hypothesis must not be dropped without "good reason" (e.g., the falsification of one of its consequences). (3) Rules for scientific procedures must be fashioned so as not to protect any statement against falsification. Cutting himself loose from the traditional and somewhat unprofitable discussion of the principle of causality, Popper uses in its place this methodological rule: "We are not to abandon the search for universal laws and for a coherent theoretical system, nor ever give up our attempts to explain causally any kind of event we can describe" (p. 61). A causal explanation of an event is a description of it, deduced from a conjunction of some universal laws and some singular statements (the latter are the initial conditions).

Among other problems posed by the discussion of scientific theories and rules, we discover that of abstraction. Popper judges that

> any attempt to define universal names with the help of individual names is bound to fail. This fact has often been overlooked, and it is widely believed that it is possible to rise by a process called "abstraction" from individual concepts to universal concepts. This view is a near relation of inductive logic, with its passage from singular statements to universal statements. Logically, these procedures are equally impracticable. (p. 66)

THROUGHOUT his exposition, the author drives home the idea that scientific theories are strictly universal statements. They have the logical form, "Every x has the property Y." It can be demonstrated that they are expressible as strictly existential statements, namely, "There does not exist an x which does not have the property Y." Consequently, as far as applicability and testability go, they are non-existence statements. On this logical ground the convention of falsifiability is built. On the other hand, the inference from "There is an x with the property Y" to "Every x has the property Y" is fallacious. The hinge of logical positivism — verifiability — is broken. Among the issues related to theoretical systems, Popper points up the importance of consistency by showing that from an inconsistent system any conclusion whatsoever can be derived. Such a system is, therefore, uninformative; moreover, the condition of consistency is analogous to that of falsifiability, for the failure to meet each condition results in an inability to differentiate in a crucial respect between any two statements. Thus, consistency is the most general requirement for a system. It is, however, a negative test for truth.

Basic statements cannot be justified by sense perception, because every scientific statement goes far beyond what can be known with certainty on the basis of immediate experience (p. 94). For example, the universals occurring in "Here is a glass of water" cannot be correlated with any specific sense experience. Presumably we should understand that, while basic statements are testable, they cannot be justified by sense

experience. This theme leads Popper to accent the severity of tests rather than simplicity and elegance in the choice among theoretical systems. But, in the cases of all scientific statements, the testing process is unlimited—scientific inquiry *via* testing has no final resting place. As a matter of fact, Popper argues for a more general suspension of scientific theory above any presumed bedrock of facts.

> The empirical basis of objective science has nothing "absolute" about it. Science does not rest on rock-bottom. The bold structure of its theories rises, as it were, above a swamp. It is like a building erected on piles. The piles are driven down from above into the swamp, but not down to any natural or "given" base; and when we cease our attempts to drive our piles into a deeper layer, it is not because we have reached firm ground. We simply stop when we are satisfied that they are firm enough to carry the structure, at least for the time being. (p. 111)

IN A DETAILED discussion of testability, the author elaborates the idea that falsifiability is a matter of degree. This is shown by comparing the classes of potential falsifiers of different theories. The comparisons are made (a) by means of the subclass relation and (b) by means of the set-theoretic concept of dimension. Turning to the question of simplicity among scientific theories— a topic commonly discussed under the law of parsimony or Occam's razor—Popper rejects some conventional criteria, namely, esthetic and pragmatic ones. Often they are not relevant to the problems and goals found in empirical inquiry. He equates simplicity with degree of falsifiability, showing how this criterion is more commensurate with the nature and goals of scientific inquiry. His theory of falsifiability explains why simplicity is desirable. In short, "simple statements, if knowledge is our object, are to be prized more highly than less simple ones *because they tell us more; because their empirical content is greater; and because they are better testable*" (p. 142).

In his treatment of probability, Popper decides for a frequency (empirical) theory as being more applicable to empirical science than a subjective (rationalistic) theory. But

he undertakes a revision of the frequency theory in order to "relieve the present unsatisfactory situation in which physicists make much use of probabilities without being able to say, consistently, what they mean by 'probability,' " (pp. 146-147). The reconstruction is achieved by use of set-theoretic considerations which we cannot introduce here. The result is the definition of a formally singular probability statement (describing the probability of a single occurrence), which, in the author's opinion, is capable of bridging the gulf between the so-called subjective and objective theories of probability. In the appendices, Popper develops in a rigorous way the theory of probability as a formal system.

THE AUTHOR'S discussion of probability leads to a brilliant and lucid exposition and critique of some aspects of quantum theory, which is given a probability interpretation. The mathematical formulae interpreted by the Heisenberg uncertainty principle are construed as formally singular probability statements. Popper argues against the indeterminist metaphysic so often inferred from the Heisenberg principle, showing that measurements of a higher degree of precision than is permitted by the uncertainty principle are not incompatible with the formulae of quantum theory. Indeed, the existence of limits of attainable precision asserted by Heisenberg was an additional assumption, not a deduction from the formulae. This additional postulate contradicts the formulae of quantum theory, when they are statistically interpreted. While Heisenberg started out to eliminate from Bohr's theory certain unobservables or metaphysical factors, he included in his own theoretical structure similar demons. Quantum theory would be untestable and therefore metaphysical, if, as the common interpretation has it, single measurements of a precise nature were ruled out.

The author's presentation closes with a discussion of corroboration (to be distinguished from verifiability). In assessing scientific hypotheses, we should determine what tests they have withstood. Popper emphasizes the methodological importance of the non-verifiability of theories. Even under a

probability interpretation, verification is precluded; for strictly universal statements are not sequences of basic statements. They cannot securely be erected from basic statements; nor can basic statements be deduced solely from universal ones. Inductive logic and probability logic are, therefore, impotent in empirical inquiry. The book ends with an appealing and persuading conclusion which underlines the open-ended nature of empirical inquiry, the tentative status of scientific theories and knowledge, and the adventure of exposing our ideas to the hazard of refutation. The idol of certainty, which is the defense of obscurantism, is shattered. In contemporary spirit, the *Logic* thus ends.

THE NEW appendices number twelve. They are a series of remarks — some simple, but others very technical — on demarcation and induction, the construction of a formal system for the theory of probability, an objective characterization of randomness as a type of order, simplicity and dimension, corroboration, and the use and misuse of imaginary experiments. It is in the domain of probability theory that Popper's ideas show the greatest change since 1934. He still answers in the negative, however, the question as to whether the degree of corroboration of a theory is a probability.

> I think that we shall have to get accustomed to the idea that we must not look upon science as a "body of knowledge," but rather as a system of hypotheses; that is to say, as a system of guesses or anticipations which in principle cannot be justified, but with which we work as long as they stand up to tests, and of which we are never justified in saying that we know that they are "true" or "more or less certain" or even "probable." (p. 317)

Corroboration refers to the severity of the tests passed by a theory or to the manner in which it passed the tests, and the probability of a statement simply does not express this.

III

POPPER has produced a clear and strong argument against the principle of induction, an enigma throughout the mod-

ern period of science. Furthermore, he has shown that even under a probability interpretation the principle fails. This refutation, together with his deductive method of testing and the theory of corroboration, constitutes a major advance in philosophy of science. His theories produce an ideal but authentic picture of what actually goes on in scientific research, something which the conventional discussions centered on induction, probability of hypotheses, Mill's canons, the law of parsimony, et cetera, never did produce. The atmosphere of artificiality is swept away by his lucid exposition.

The author seems, however, to go too far in protecting himself against psychologism. He does not raise the question as to the genesis of scientific ideas and theories—"There is no such thing as a logical method of having new ideas" (p. 32). "The act of conceiving or inventing a theory seems to me neither to call for logical analysis nor to be susceptible of it" (p. 31). In addition, he does not outlaw the use of any kind of idea in science. "I do not believe in hampering scientific language by preventing the scientist from using freely, whenever it is convenient, new ideas, predicates, 'occult' " concepts, or anything else" (p. 378). Nevertheless, Popper is persuaded that an inquiry as to the roots of scientific ideas and theories in the human mind and as to their fetal structure is not an epistemological or logical study. Yet his 1958 Preface talks about cosmology, the understanding of the world, as including *ourselves* and *our knowledge* (p. 15). While we are to study the growth of scientific knowledge, there is evidently a stricture against the study of the *a priori* categories by which our experience is organized and from which, at least in part, theories are built. Since our scientific ideas are a part of ourselves and arise in a context of experience organized by mind, the question about their genesis is not metaphysical. While there are psychological factors to be studied by the psychologists, the concepts and categories used by the mind (for example, the distinction between the real and the unreal) bear logical relations to all parts of our experience and to our developed scientific theories. We have here a real epistemological problem which is related to science.

INASMUCH AS Popper is going to use the method of deduction from theories, the genesis and fetal structure of such theories should be his business. One who is committed to induction, probabilities, and the "new way of ideas" has his view of the origin of scientific ideas, although it be a faulty one. Popper clearly does not agree with him. It seems fair to ask Popper, then, to give his answer to this question or to probe into the origin and structure of the categories by which a scientific investigator interprets his world in theories. In the reviewer's opinion, it has a direct bearing upon what can be accomplished through the use of a deductive method. Such an inquiry could degenerate into psychologism; but it does not have to do so. It can be a distinctly epistemological and logical enterprise. We think, for example, of the definition of the problem of the categories in C. I. Lewis' *Mind and the World Order* (New York: Dover Publications, 1956), which advocates a "conceptualistic pragmatism" that in some respects echoes Popper's method of testing. In harmony with Popper's theses, Lewis observes that "the tendency to forget that initial concepts are never merely dictated by empirical findings is precisely what accounts for the absurd prejudice—now happily obsolescent—that science is 'just the report of facts' " (p. 6). The categories are implicit in our practical and scientific dealings with the empirically given. Scientific theories are instruments of interpretation and they rest back upon these categories. A full understanding of scientific theories requires, therefore, an analysis of the nature and function of these interpretative concepts.

> The a priori element in natural sciences goes much deeper than might be supposed. All order of sufficient importance to be worthy of the name of law depends eventually upon some ordering by mind. Without initial principles by which we guide our attack upon the welter of experience, it would remain forever chaotic and refractory. (Lewis, p. 254)

Among scientific statements, argues Popper, there is a gradation on the basis of generality or universality (p. 47). At the bottom of the hierarchy are what the author has termed

basic statements (statements of singular facts). These basic statements are not verifiable, but they can be falsified or corroborated. They may be employed in conjunction with other statements in an interminable process of deduction (pp. 47-48). This process is, however, in fact ended by decision (p. 104). In the main the reviewer is persuaded by the author. He will pose two questions for Popper.

FIRST, although we abandon the idea of verifiability, the procedures of corroboration and falsification, especially in the cases of basic statements, obviously imply some connections or relations between the basic statements and occurrences experienced. Otherwise, the discrimination between the falsifiable and the non-falsifiable would disappear and with it Popper's rule of demarcation and the whole structure of his philosophy of science. He is then in the same stew which he brewed for the conventionalists and positivists. He does assert that an empirical system—and therefore basic statements—must represent our world of experience (p. 39). On the other hand, speaking of the statement, "Here is a glass of water," he says that the universals ("water," "glass") which appear in it *cannot be correlated* with any specific sense-experience (p. 95). That the character of universals precludes verification is understandable. It does not preclude corroboration or falsification, Popper clearly maintains. In the phrase "cannot be correlated," then, we have at least either an overstatement or an inexact statement. There must exist betwen basic statements and observational experiences some correlation or some relations; otherwise, Popper's whole program falls apart. Just what is that correlation, or what are those relations? By virtue of what relations do we recognize a given factual situation to constitute a falsification or a corroboration of a statement? There is a void in the *Logic* at this crucial point.

SECOND, the reviewer wishes to ask about the correctness of Popper's contention that deduction from a conjunction of statements of theory and basic statements may go on without end. According to him, the process must be ended by a decision (pp. 104-111). We will overlook the question as to

whether or not he is allowing the demon of psychologism, which he tries so assiduously to avoid, to enter the back door. The reviewer will suggest that a system of theories is more or less fertile. Its degree of fertility is measured by the number of distinct and significant conclusions which can be deduced from it. If it is true that a given system is of finite fertility, Popper's theme of interminable deduction must be revised or rejected. A set of theories acts as a conjunction of premisses from which deductions are made. The set of statements expressing the theories may be tested for consistency, independence, and other characteristics. It has generally been recognized that fertility is a character of postulate systems or sets of premisses; but, so far as the reviewer knows, no measure of fertility has been uncovered. Now an inconsistent system implies every proposition. It may be called infinitely fertile. On the other hand, a single proposition, taken by itself as a premiss, implies only a few propositions, which are generally produced by the conventional operations of immediate inference ("Every metal is liquid" implies "No metal is non-liquid," et cetera). The fertility of sets of premisses should range between the extremes suggested by these examples. A more careful analysis than can be undertaken here should result in a measure of fertility for sets of premisses. Given a certain number of statements, deduction can be carried to only a certain point without its becoming redundant or irrelevant. We suggest, then, that a revision in Popper's method of deductive testing is necessary, especially at the point where he argues that the process of deduction is interminable and must be closed by decision. In the reviewer's opinion, the open-ended and on-going nature of scientific inquiry does not have to be defended on the ground of the interminability of the process of deduction.

Popper accents the idea that perceptual experience cannot justify basic statements. He thus preserves everywhere the distinction between things and words or statements. As a result, on the basis of experience there is no proof in the sense of acquiring certainty for any basic statement or for any theory. Although he does not similarly emphasize it, he is apparently

prepared to admit that deduction of conclusions from premisses similarly cannot provide proof in the sense of certainty; for the premisses track back to some postulates, to which the modern spirit will deny self-evidence. For such reasons, there is no such thing as certainty in the whole realm of statements. This result does not, we judge, give Popper any uneasy moments, for his whole emphasis is on the hypothetical and tentative nature of scientific assertions. We may express the result in another way, namely, that proof is at heart persuasion (there is a partial or indirect admission of this on page 99). Put this way, the upshot of the analysis may cause some to shrink back. Are those right who most effectively persuade? Or, are those right who persuade for the proper ends? If either question is to be answered, we discover that we must import value judgments into the domain of scientific inquiry. Whether fortunately or unfortunately, a bridge is built from science to ethics. Many would maintain that there is something wrong about answering philosophical or scientific questions in terms of what it would be "good" to say in answer to them—if, indeed, this is what is entailed by the interpretation of proof as persuasion. In any case, Popper's suspension of the structure of scientific theories above the bottomless swamp of an empirical base means that it is from time to time forced down to a "firm ground" by value judgments operating in decisions which stop the process of deduction and testing.

POPPER very nicely shows that the degree of corroboration of a theory or hypothesis is not a probability. We may as well give up talking about more or less probable hypotheses as we seek guidance in inquiry. Even if, for the sake of argument, we grant that it is meaningful and useful to assign a probability to a hypothesis, an additional difficulty arises. A probability has reference to a set of occurrences. Thus, if it is said that the probability is ¼ that a woman of 65 years who contracts pneumonia will survive, we might be able to assert that, of the next 400 such women, approximately 100 will live and approximately 300 will die. Unfortunately, this tells me nothing about my 65-year old grandmother who has

pneumonia. In other words, any such probability gives no information about singular occurrences as such. Popper's category of formally singular probability statements does not come to grips with this problem, for his formally singular probability statements refer to single occurrences only in terms of their being members of sequences or sets. But, in the practice of science, we frequently would like to know about such singular occurrences as such. Moreover, very often those who use probability statements presume to be giving us information of this kind. We have here one reason why, at least in the reviewer's experience, writers on science talk about probability more than do scientists who are engaged in inquiry or research. Probability statements are simply non-informative in many (perhaps not all) domains of scientific practice. The reviewer should add that he has no high hope that his desire for specific information about his grandmother will be fulfilled.

IV

AGAINST THE language analysts, Popper contends that there are authentic philosophical problems in scientific inquiry. To the positivists he throws the challenge that their criterion of verifiability is impossible. The conventionalists he criticizes for protecting an elegant theoretic system in face of falsification by the use of *ad hoc* principles. The physicalists and old-style empiricists, as well as others, are confronted with the shattered idol of the principle of induction. And the many-sided battle is fought brilliantly on every front. Above all, we are presented with principles relevant to actual scientific practice. Science is no system of certain statements, nor is it knowledge in the sense of certainty. It is a process of inquiry, moving chiefly on the motive force of falsification. It is an adventure and a risk; for nature can say decisively, "No," but only inaudibly, "Yes." "We do not know: we can only guess."

WALTER E. STUERMANN

University of Tulsa

Varieties of Communication

THE ZULU AND THE ZEIDE, Short Stories by Dan Jacobson. Boston: Atlantic-Little, Brown, 1959. 247 pp. $3.75.

THE VOLUME opens with a story called "The Box," in which Jan, a colored houseboy, builds a realistic little house for the pigeons of his three young masters. Proud of it, and eager for praise, he explains to Master Dandy, who is narrator (probably the author himself), the doorways and partitions. Next day Master Dandy looks for a mating box, finds Jan's little house handy, and tears out the "absurdities." Jan cries, and Master Dandy is astounded—he didn't know they felt like that. "And *they* were all the colored and African people that I passed every day and took for granted." He couldn't put his arm around Jan, for "he was still black." Only that one step toward understanding is taken in this story.

The fourteen other stories indicate that "Master Dandy" has taken quite a few more steps toward understanding, though apparently not all the stories are personal. Jacobson makes the racial and religious difficulties he grew up among in South Africa look scarcely more foolish or terrible than the communication difficulties between any two people anywhere. Some difficulties are more private, more lonely than others—and possibly less easy to resolve. The author seems as much concerned with these as with the massive issues.

I like best the stories that show successful communication in a most unlikely relationship against a background of failure within a race or a family.

In the title story, the only one in the house who talks to old man Grossman is his son, Harry, who doesn't so much talk to him, as talk of him to others, reproachfully. As almost a joke against his father, Harry hires a raw Zulu to guard the old man in his troublesome daily escapades. These two childish characters, one senile, the other ignorant, walk the streets together, hand-in-hand when the traffic is particularly heavy.

> Paulus knew only Zulu, the old man knew only Yiddish, so there was no language in which they could talk to one another. But they talked all the same. They both explained, commented, and complained to each other of the things they saw around them, and often they agreed with one another, smiling and nodding their heads and explaining again with their hands what each happened to be talking about. They both seemed to believe that they were talking about the same things, and often they undoubtedly were . . .

At the end it is Harry with whom the author wants us to sympathize. I have read hundreds of short stories since trying to master the form myself, but few more appealing than this one.

"The Little Pet" shows communication broken down between a boy and his parents, yet the boy is able to forgive his rabbit for the crime of devouring its own baby. This was more than the parents could do, though their crime was similar in kind if not in degree.

Only one story, "The Burden," seems ordinary, but still appealing. It tells of African policemen showing respect for a drunk who had been treated with contempt by a taxi driver of his own race. Here, in this country too, we know of a gentleness between races that shames the cruelty within.

In this variety of communication difficulties, Jacobson neither preaches nor offers solutions, aside from the example of his own deep understanding. Yet I believe that he may, through his art, help speed up the human cooperation that advances so very slowly through other means, where it advances at all.

KATHERINE DUNFORD

Washington, Connecticut

• CORRESPONDENCE •

Noun$_1$ is Not Noun$_2$

SIRS: Reading *ETC.* I came across Rapoport's review of Mother Margaret Gorman's book, *The Educational Implications of the Theory of Meaning and Symbolism in General Semantics* (XVI [1959], 133-153). I was disappointed with Rapoport's velvet-glove handling of the mystical and metaphysical nonsense that this Mother Gorman dishes out. There is no doubt that he and other leaders in general semantics have themselves become entangled in the very words with which they claim to be able to save humanity, and now they cannot escape. General semantics has been emasculated and has become a robot that parrots high-sounding words which confuse instead of lighting the dark caverns of the brain. This has, of course, happened to many reform movements. *"Plus ça change, plus c'est la même chose."*

"The Thomist needs nouns," says Rapoport, "because God is a noun, and God must be shown to exist. For exactly the opposite (or perhaps more fundamentally the same) reason, the Communists need nouns, because matter is a noun and matter must at all costs be shown to underlie the All."

How can a man of Rapoport's analytical mind fail to grasp the enormous difference between these two nouns, God and Matter?

The Thomist needs nouns like God and Soul, because without these nouns he has nothing. In this case *the word is the thing.* But matter is more than a noun. Matter is reality, a tangible thing, which does not disappear with the word. Matter is the only Absolute we know. We ourselves are matter and live in it and by it.

Rapoport's analogy between the Thomists and the Communists is fallacious and ill-thought. The Communists do not

have to persecute and burn at the stake anybody who does not believe in matter as the Thomists have done with those who would not believe in God. I can hardly think of a word in the dictionary that has made more trouble than that noun which Mother Gorman is still trying to sell us—God. Any real semanticist would have torn Mother Gorman's thesis to shreds and put her in her place, in the metaphysical swamps where no self-respecting scientist dares to enter.

J. M. MARTINEZ

Miami, Florida

Reply by Rapoport

SIRS: If there is a preferred pattern of behavior implied in the outlook known as general semantics, it is this: avoid strongly polarized, stereotyped reactions to symbols which act like signals, triggering automatic pre-packaged responses. On the contrary, take cognizance of specific, concrete aspects of the situation at hand, and behave appropriately to what actually confronts you, not to the fixed verbal category in which you have automatically put it.

In writing my review of Mother Gorman's dissertation, I tried to apply this principle and to express my satisfaction that she too adhered to it when she examined the literature on general semantics. I think the cause of improved communication and language hygiene is well served if this principle is applied whenever ideas are evaluated, whether those of Communists or Conservatives, of Catholics or Atheists. To flaunt the excesses of the Inquisition in a philosophical debate with a Thomist is just as unproductive (from the standpoint of modifying his views, which, after all, is the object of debate) as to refute a dialectical materialist by condemning Stalin's persecution of political non-conformists.

I believe that intolerance, callousness, and un-sanity are induced in people not so much by the content of their outlooks as by the frenzy with which they hold on to them, by the

extent to which the outlooks encourage stereotyped affective responses and discourage re-evaluation and awareness of the extensional non-verbal world of events.

Admittedly, some outlooks by their very content tend to induce rigid orientations. I have long felt that both the Catholic and the Communist outlooks tended to do so. But to act as if all Catholics and all Communists were inherently incapable of examining facts, of making careful discriminations and dispassionate judgments, or pursuing self-appraisal would be to succumb to the same kind of stereotypic response of which I have often accused Catholics and Communists.

The question is not whether God or Matter shall be the Absolute, but whether it is a good idea to worship *any* Absolute deified by a noun. I think the answer is no. That is why I argue against Absolutists of all persuasions. But to the extent of my capacity I try to avoid the manner of argument characteristic of Absolutists. And when I come across an opponent like Mother Gorman, I am especially happy, because then I am assured that my attitude toward debate is not confined to those of my own persuasion. If it were, then all discussion would be limited either to reiteration of the same point of view or to exchanges of diatribes; and that would be dull.

ANATOL RAPOPORT

Implications of Reading Experience

SIRS: I thought Don Brown's article, "What is the *Basic* Language Skill?" the most useful in the Winter 1956-57 issue of *ETC*. He states that his theories have profound implications for education. I do not think he even gives a clue, however, as to what those implications are. This permits any intensionally oriented reader to read his own pet theory into the article.

For example, Rudolf Flesch, writer of *Why Johnny Can't Read,* could, I believe, support the ideas in this article 100 percent—except for the idea that the distinction between recog-

nition and comprehension has something to do with language training—and use them to bolster his own assumptions. For instance, there is the assumption that "We must train the child to respond vocally to the sight of the letters." The emphasis on the idea that auding "is" the basic language skill encourages this sort of thing. The hidden assumption creeps in that what is, is what should be. Another point of similarity between Brown's article and Flesch's book is that the ambiguity of the word "reading" is not recognized. By "perfect reader" Flesch meant anyone who could read almost anything out loud, without regard to comprehension, and his objective was to inculcate such verbalism at as early an age as possible.

I am intrigued by the idea implied by the word "usually" in J. M. Nielsen's statement, quoted by Brown, "The angular gyrus is usually dependent upon the area of Wernicke but the area of Wernicke is independent of the angular gyrus." A similar idea is implied by Nielsen's statement, "The agraphia results secondarily because most patients are unable to write unless they have the motor patterns for speech associated with their writing mechanism." I suppose such secondary agraphia can be remedied by retraining.

An implication I can draw is that a clinical report on an aphasic should if possible include some description of the methods by which he had been taught to "read" and write.

K. B. McCUTCHON

Regina, Saskatchewan

Auding and Reading

SIRS: Thank you for the chance to read and reply to Mr. McCutchon's letter. The questions he raises are perceptive. In answer I will spell out a few implications of neurological studies in aphasia for education, but first let me draw some distinctions.

Oral (as distinguished from silent) reading involves the complex and extensive speaking musculature, and therefore

a mechanical as well as a neuro-electric time-factor. Vocalization in reading puts severe limits upon rate of reading, and there is some reason to suspect that sub-vocalization (mentally "saying" the words) does, too. Auding, however, involves no muscles (except for the rare activation of the stapedius in response to violent increase of amplitude) and so can proceed at far greater speeds—type and organization of information permitting—than the fastest human speaker can release the information, according to rate-control and speech-compression studies by Goldstein, Fairbanks, and others.

The sub-auding which normally takes place in silent reading evidently puts no drag on reading speed, and at the moment I am persuaded that it expedites comprehension, though I am not convinced that it is a *necessary* accompaniment, despite some provocative evidence of sub-auding in very expert reading—the recognition of rhymed verse disguised as prose, for example.

If auding and reading remain linked—if their twinship remains Siamese—the two activities nourish one another. Auding experience is training for like reading tasks, and reading experience prepares one for similar auding tasks. The connection of the two processes is normal and, I believe, salutary. Their divorce offers no gain to justify the expense of separate maintenance. The problem is not one of vocabulary merely, but also of intonation patterns, of pitch and emphasis (such as is required to read the two sentences following the Flesch quotation in Mr. McCutchon's second paragraph), and of semantic discipline.

I have little patience with Flesch's position and less with his methods of supporting it. His book is misleading precisely because it contains a number of valid premises, among them the premise that our system of writing represents speech. From here, however, he would lead us to presume that reading, too, is an extension, not of auding, but of *speaking*. People with no better concept of auding than that commonly represented by the word "listening" are not as well protected against this reasoning as they might be.

Auding is important enough in its own right as a language

process to take its place with reading, speaking, and writing in the language curriculum. It needs to be clearly identified as a language process and rescued from its present confusion with the related functions of attention, hearing, and intelligence. It deserves, furthermore, to be recognized as the matrix of the speaking, reading, and writing abilities, and emphasized accordingly.

THE SCHOOLS should offer a rich and rigorous program of auding training from the earliest school years at least until the first years of college. The auding program should anticipate and support the developing programs in reading, speaking, and writing. Adequate samples of auding performance should be analyzed periodically with the help of standardized auding tests. The best tests now commercially available are those developed by Educational Testing Service (Princeton and Los Angeles) for Grades IV through XIV. Test results, together with other pertinent data, should be used to discover which pupils need (or deserve!) and can profit from special training, (remedial or developmental) just as with the results of reading tests.

DONALD P. BROWN

San Fernando Valley State College
Northridge, California

Some Varieties of Realism

SIRS: Certainly among the most troublesome terms that the literary critic has to deal with is "realism." The responsible teacher, though, can give it a context that makes it a reasonably workable term, which is more than the average undergraduate in the literature class can do. Time after time the hand-waving student, with a triumphant this-is-the-last-word-I've-got-the-stopper-right-here expression on his face, will deliver the opinion on a given piece of writing that "it isn't realistic," ergo, it's bad, or "this is really realistic," which means that it's good and nothing more need be said about it.

The label "unrealistic" gets itself attached at some time or another to whatever Greek tragedy is being read, to any one of Shakespeare's plays ("Boy, this Othello character must really be nuts to act that way; nobody in real life would fall for the things that Iago pulls"), to Dante, to Milton—to almost any pre-Balzacian work that you might care to mention.

One way of handling this kind of terminological fuzziness is to don your best philosophical garments and to ask the label-paster just what he means by "real" and "reality." Plato, Bertrand Russell, and just about every other philosopher who ever drew breath can be sworn into service on this question, which can fairly easily strip the label-paster of both label and paste and at the same time leave his contemporaries gasping at your erudition. It can also, of course, be enormously time-consuming while failing to advance the pedagogical enterprise.

A strategy which I found to work much better than asking students to define "reality" is to get the class to see that there are several different varieties of realism, and that a writer may be trying to achieve one variety without attempting at all to achieve any other. More specifically, I distinguish between total realism, psychological realism, social realism, and surface realism, first of all making the necessary qualifications that these are ideal types, that they do not necessarily exhaust the possibilities, and that they are not in actual practice mutually exclusive.

FOR MY EXAMPLE of total realism (or at least as close to it as we can get) I use Tolstoy's *Anna Karenina,* pointing out that there is no character or action or scene in this novel which in some way cannot be said at least to approximate a corresponding character, action, or scene in the world outside the novel. As an example of a literary work which concerns itself only in the most abstract and generalized way with the representation of people, places, and situations in the "real world," yet does strive for psychological realism, *Everyman* works quite well. So, in a different way, because both its end and its means are so different, does *Antigone. Joseph Andrews* does nicely as a literary work that, without attempting to get

inside characters' minds, manages to convince the reader that the network of social relations it sets up bears a more than passing resemblance to the social relations that we know to have existed in eighteenth century English society. The last variety of realism, which I designate "surface realism," is far and away the easiest to deal with since its evidences are all around you—and, more important, the student—in the popular culture. Mickey Spillane's novels can be used here to make the point, as can a well-known manifestation lying outside the bounds of literature, *Dragnet*. The point, very simply, is that entertainments (or whatever you want to call them) like these offer for one's inspection elaborate descriptions of people and saloons and taxicabs and such that are thoroughly convincing because drawn so nearly to a recognizable extra-fictional scale. In short, the *Dragnet* sort of thing is intended to reflect the surface of reality but it either leaves out of account or fakes the under-the-surface mind and personality and the social matrix, all of which are as much part of the "real" world as Officer Smith's burps and mild complaints about his wife's breakfast-table nagging.

I think that the value of this kind of distinction-making is obvious enough. But there is at least one other value to tackling realism in this way, implicit in my comment on surface realism. Going at the matter in this fashion enables you not only to force the student to sharpen his distinctions where realism itself is concerned, but also to demonstrate that simply writing realistically is no particular achievement—almost every two-bit writer in our time is doing that. You are thus in an excellent position to show them that there are other modes of getting at reality than surface realism; that fantasy, allegory, and such deliberate heightenings or even distortions of realism as expressionism and surrealism may be just as legitimate literary roads to reality.

HAROLD J. HARRIS

Kalamazoo College,
Kalamazoo, Michigan

'Clear Only If Known

SIRS: Edgar Dale's article in *ETC.*, XV (Summer, 1958), 290-293, was particularly interesting to me, because I have recently observed some similar instances of this sort of semantic confusion, ineffective communication, and omission of essential steps. I present them herewith.

A certain petroleum company has a series of billboards bearing slogans such as the following: "More people go farther with Blank gas—than anybody"; or "More people get better mileage with Blank gas—than anybody." The complete lack of any logical connection between these two parts is readily apparent to one who tries to view the statement with regard to its semantic correctness. If this is an attempt at humor, and I do not believe it is, it has failed with me.

A similar instance can be adduced by a recent spate of telephone company billboards, reading, for instance: "Bedroom telephones IN COLOR—so convenient." Here attention is erroneously focused on the fact that they are convenient because they are in color, and not because of their location.

On Highway 99, approaching Seattle from the south, there is a series of signs reading "Stop Ahead When Flashing," and at the entrance of the tunnel leading to the Lake Washington Floating Bridge, is one which reads "Do Not Enter When Flashing." These signs never fail to produce the following bit of colloquy between my wife and myself: "Are you flashing, dear?" "No, are you?" "No. Then we may proceed."

My own subject is the study of Mongolian culture and language, and while I have the attention of the *ETC.* reader, I may perhaps acquaint him with an interesting example of semantic confusion resulting in a failure of communication between Europeans and Mongols. When a statement or imperative containing an unstated but semantically implied negative is made to a Mongol, both possibilities of the condition must be expressed in words; otherwise, the native will consider the directions semantically unclear according to his system. Thus, if you say to a worker, "Don't come tomorrow if

it rains," he will not come whether it rains or not. When queried as to this seemingly irrational action, the reply will be to the effect, "But you didn't say *to* come if it doesn't rain." Thus, when making such statements to a Mongol, both the "protasis" and "apodosis" of each possibility must be stated, viz., "If it rains tomorrow, don't come; if it doesn't rain, be sure and come." The manner of expression in the Mongolian language lends itself to this type of phrasing.

JOHN R. KRUEGER

Reed College, Portland, Oregon

DATES AND INDEXES

THIS IS the Autumn 1959 issue by definition; actually it is published in February 1960. Our Summer 1959 issue appeared just before Christmas, and most subscribers received it between Christmas and New Year's Day. It is time we reprinted from our Winter 1956-57 issue the verse contributed by Don Zilversmit of the department of physiology, University of Tennessee:

> The readers of *ETC.*
> may wonder at the reason
> that issues of this journal
> do not appear in season.
> The autumn number comes in winter,
> the winter issue breaks in spring.
> Does it not confuse the printer,
> for—who knows what time will bring?
>
> But those of us who know the story
> that Count Korzybski used to sing,
> who said that maps ain't territory,
> and word or symbol not the thing,
> do not require an explanation
> of facts so evident and clear:
> the names of seasons in *our* language
> do not denote the time of year.

As we were contemplating the foregoing dismal facts, there arrived in the mail, on December 22, 1959, the fourth quarterly issue for 1958 of *The Journal of Social Issues.* Sometimes a sinner's only consolation is that there are others whose sins are even graver. The editors of *ETC.* are deeply grateful to the editors of *The Journal of Social Issues.*

THE HONOLULU CONFERENCE. There is still time to submit papers for the International Conference on General Semantics, to be held in Honolulu on the invitation of the University of Hawaii, July 29 to August 4, 1960. *The deadline for papers has been extended to March 15.* The rules governing the selection of papers are as follows:

1. Papers may be submitted in any language. However, papers submitted in languages other than English, French, German, Spanish, and Russian should be accompanied by an English translation or abstract.

2. In order to allow abundant time for discussion and to maintain a high standard, the number of papers to be presented will be limited.

3. However, in order that everyone may have an equal opportunity to appear on the program, papers will be submitted *anonymously*, so that they may be judged on merit alone. Papers should be submitted *in duplicate*. The author's name should be enclosed in *blank, sealed envelopes*, attached to *each* of the two copies of the typescript.

The presentation of papers is not limited to professional scholars, scientists, and academicians. Non-academic members with ideas to submit are especially urged not to permit a lack of familiarity with scholarly formalities to deter them from submitting papers.

4. Papers, or abstracts thereof between 500 and 1000 words in length, may be submitted at once to:

DR. S. I. HAYAKAWA
San Francisco State College
San Francisco 27, California

Papers and abstracts must be postmarked *not later than March 15, 1960*.

THOSE ATTENDING THE CONFERENCE will be interested in the package tour costing $349.75 which has been arranged by the official travel coordinator, Andrew W. Lerios, Inc. This sum includes round-trip air fare from the Pacific Coast to Honolulu, six nights in the beach lanai units at the Hawaiian Village Hotel, an all-day tour of Oahu and a yacht cruise around Pearl Harbor, three luncheons, two cocktail parties, three dinners, and of course registration for the conference together with the official programs, papers, etc.

Other specially-priced packages for those staying longer in Hawaii or taking other tours are being set up. Full information may be obtained from Andrew W. Lerios, Inc., 133 Montgomery Street, San Francisco 4. The firm also will book transportation from anywhere in the United States or elsewhere.

HOW OFTEN have you been to conferences and been too busy to enjoy the place in which the conference was held? For the meetings in Honolulu, the Arrangements Committee and the Honolulu Chapter of ISGS are determined that participants will get a chance to enjoy the city, the climate, the island life, and each other.

Conference sessions will be held in the morning; *all afternoons will be free, except for optional sightseeing tours*. Evenings will be devoted largely to festivity.

These plans may sound frivolous to the serious semanticist, but the committee, in making these plans, was guided by serious considera-

tions. From past conferences, we have learned that the unplanned and spontaneous discussions that occur among old friends and new are among the most important results of our meetings. Hence, the committee has tried to attain a more even balance between "structured" and "unstructured" gatherings than is usually found at learned conferences.

To be more specific: participants coming from the mainland by air on the package tour will leave West Coast airports Thursday, July 28 (thus avoiding higher week-end travel rates) and arrive Friday morning, July 29. Except for arrival ceremonies (a Hawaiian specialty) and registration, the day is free until the reception at 6 p.m. and the opening evening meeting. Saturday, July 30, is devoted to motor coach tours of the Island of Oahu—no meeting is scheduled until 7:30 p.m.

Formal presentation of Conference papers begins Sunday, July 31, and continues daily, 8:30 a.m. to noon (with time out for a coffee-break), through Wednesday, August 3. Luncheon on each of these days, at which each speaker of the day will be assigned a table, will give participants the opportunity to continue discussions with the speakers that particularly interest them.

Evenings will give participants the opportunity to experience some of the exotic luxuries of island life: a Polynesian cocktail party and a Hawaiian "Feast of the Islands" luau on Sunday; a Japanese tea-house dinner with folk-songs and dances on Monday; an Aloha reception at the Hawaiian Village on Tuesday; a Chinese banquet on Wednesday with, we hope, an outstanding and memorable speaker.

On Thursday morning, August 4, the Conference will be divided into workshop sessions on a variety of topics—the topics to be chosen according to the expressed interests of the participants. Luncheon on this day will be followed by closing addresses and ceremonies, following which, after another dip in the waters at Waikiki, the package-tour travelers may catch an evening plane—while those planning to stay longer may rest in preparation for visits to other islands (here's hoping that Kilauea Iki on the Big Island will put on another show!) or for the post-Conference "Seminar in Semantics" (q.v.).

OF COURSE, for residents of Honolulu and the Islands for whom the sights to see and the "exotic native feasts" are old stuff, there will be a special "Kamaaina" registration admitting them to all Conference sessions and speeches, and omitting the hotel reservations, cocktail parties, banquets, sightseeing tours, and all the tourist razzmatazz. They will miss a lot, but mainland participants need not feel sorry for them—they live there!

THOSE UNABLE TO ATTEND the Conference may obtain a special absentee registration. For $7.50, the conference program and other

papers, plus all mailings, will be supplied. In addition, this amount includes a full year subscription to *ETC.*, in which various leading conference papers will be published. For absentee registration, send $7.50 to Andrew W. Lerios, Inc., at the San Francisco address.

BEFORE THE CONFERENCE the Summer Session of the Univer- of Hawaii (June 20—July 29) is offering special courses in general semantics and its application to various fields of knowledge. In addition to the regular faculty of the University of Hawaii, there will be several visiting professors to teach these courses. Among them are ANATOL RAPOPORT (University of Michigan), Music and Philosophy; EARL C. KELLEY (Wayne State University), Education, at the University Extension in Hilo; WELLER EMBLER (Cooper Union), Humanities; S. I. HAYAKAWA (San Francisco State College), Speech and Education.

As this issue goes to press, word has been received that GARDNER MURPHY, whose work in theories of personality has been widely discussed, will also take part in the program of the Department of Psychology.

The foregoing visiting professors are all expecting to take part in the Conference and will also lecture in the post-Conference "Seminar in Semantics."

AFTER THE CONFERENCE, there will be a two-week "Seminar in Semantics" (August 8-19) offered by the University of Hawaii Department of Speech. The course will carry three units of graduate credit, but will also be open to non-credit students and qualified undergraduates. The following is a catalog description of the course:

"Speech PS-640. Seminar in Semantics. An intensive course in the origins and principles of semantics, including sessions exploring the applications of general semantics to interpersonal relations and to the functioning of groups. Insights into the communicative process drawn from semantics, information theory, group dynamics, and linguistics will be developed in lectures and demonstrations and exemplified in group experiments. Prerequisites: Speech 440 ('Introduction to Semantics') or equivalent, consent of instructor, and attendance at all sessions of the International Conference on General Semantics, July 29-August 4, 1960."

Inquiries about the six-week Summer Session may be addressed to DR. SHUNZO SAKAMAKI, Dean of the Summer Session, University of Hawaii, Honolulu 14. Inquiries about the post-Conference seminar may be addressed to DR. ELIZABETH CARR, Department of Speech, University of Hawaii.

"FOR A FINAL WORD on *Lady Chatterley's Lover,* here's part of a review of same by Ed Zern in *Field and Stream:*

" 'This fictional account of the day-to-day life of an English gamekeeper is still of considerable interest to the outdoor-minded reader, as it contains many passages on pheasant raising, the apprehending of poachers, ways to control vermin and other chores and duties of the professional gamekeeper. Unfortunately, one is obliged to wade through many pages of extraneous material in order to discover and savor these sidelights on the management of a Midland shooting estate, and . . . this book cannot take the place of J. R. Miller's *Practical Gamekeeping.*' " From *New York Times Book Review,* December 20, 1959.

THE LOS ANGELES Chapter of ISGS celebrated New Year's Day with an evening meeting at the Institute of Aeronautical Sciences to hear Dr. Charles L. Conrad speak on "Solving Personal Problems." Despite the holiday, some 175 persons attended—a tribute both to the speaker and to the strength of the chapter organization. . . . The Alan Watts lecture on "Zen and General Semantics" on December 4 in San Francisco was attended by 350 persons, one guide dog, and a pet monkey—the last accompanied by a man described by Watts as "an authentic Dharma bum." . . . On November 24, Austin Faricy, music and art critic of the *Honolulu Star-Bulletin* and lecturer at the University of Hawaii, spoke on "Music and Abstracting" before the Honolulu Chapter meeting at the home of Mrs. William Irvine in Honolulu. Illustrating his lecture at the piano, Mr. Faricy put on what was described to the editors as an "extraordinarily versatile and witty performance."

WASHINGTON, June 5—(AP)—A Roman Catholic spokesman said today the human race may have to find another planet rather than limit its population by birth control. Monsignor Irving A. Deblanc, director of the National Catholic Welfare Conference's family life bureau, made the suggestion in a statement deploring an often expressed idea that birth control is the only answer to problems created by a fast growing world population.

"I AM NOT YET so lost in lexicography as to forget that words are the daughters of earth and that things are the sons of heaven: speech did not descend to us in a state of uniformity and perfection, but was produced by necessity and enlarged by accident, and is, therefore, composed of dissimilar facts, thrown together by negligence, by affectation, by learning or by ignorance." Samuel Johnson, from the "Plan" of the *Dictionary* (1747).

THE ANNUAL WINTER SEMINAR of the Institute of General Semantics was held for the first time in New York City—at the

Barbizon-Plaza Hotel, December 27 to January 2. Dr. O. R. Bontrager, professor of education and psychology at Pennsylvania State Teachers College (California, Pa.), who has conducted the winter seminars since 1950, was again the principal lecturer. . . . Dr. Elwood Murray was designated University Lecturer for 1959-60 on recommendation of the Research and Honors Committees of the University of Denver, in recognition of "significant contributions and scholarly activities."

"THE PRINCIPLES OF SEMANTICS," by Stephen Ullman (2d ed.; New York: Philosophical Library, 1957; 346 pp.; $10). This second edition of Ullman's scholarly work brings up to date the original edition of 1951. In the first 299 pages we find a reprint of the initial edition. Following that the new material appears: a concluding chapter, "Recent Developments in Semantics," an expanded bibliography of 21 pages, and a recast index.

Ullman is not concerned with general semantics but with linguistic semantics, that is, with the exploration of the problem of meaning from a philological point of view. He attempts to formulate principles of semantic structure and development, drawing material chiefly from English, French, and other well-known European languages. As he treats it, semantics is an integral department of philology. The descriptive and historical dimensions of the discipline are treated in detail. There is only an occasional mention of general semantics as the author passes on to linguistic issues. The names of Korzybski, Ogden, Richards, Walpole, Sapir, Whorf, and a few others are briefly cited. The text is a valuable source book in the field of philology. [WES]

SEMANTICS AND ENGLISH. J. N. Hook, executive secretary of the National Council of Teachers of English writes, "Your publication is one of 264 regularly scanned by writers for *Abstracts of English Studies*. The purpose of this magazine is to present to its readers one-paragraph digests of serious, scholarly articles on English and American literature, speech, linguistics and philology, and semantics." *AES* may be ordered (12 issues a year; $4) from NCTE, 704 S. Sixth St., Champaign, Illinois.

"FOOD TABOOS produce a constant crop of difficulties for international teams working for the World Health Organization, because no aspect of a culture is more deeply rooted in custom and ritual than eating habits. The kind of subtlety sometimes necessary to overcome a food taboo is shown by an incident on international work in Viet Nam. An increase in the protein content of the people's diet was essential. More cow's milk was the obvious way to make good the deficiency. But the people of Viet Nam regard cow's milk as unfit for man. Condensed milk, however, turned out to be acceptable, especially as one of the brands used had a wrapper on it displaying a nest full of little birds. This picture helped to soothe the consciences of the

people; they called the condensed milk 'birds milk' and so escaped losing face." James Hemming, *Strategy for World Health.* Published by WHO Division of Public Information.

"AND ADAM GAVE NAMES—A Consideration of Name-Lore in Antiquity," by George R. Stewart (University of California), appears in *Names: Journal of the American Name Society,* Vol. 4, No. 1 (March, 1958). Beginning with a citation of the act of naming in the myth about Adam, Stewart notes that in the classical period whole books on place-names were written. He examines certain attitudes connected with ancient Greek naming, such as the ideas that places were never nameless and that the names of persons and places were naturally associated. While contrasting the Greek and Hebrew imagination with respect to naming, he argues that the Hebrews generally fashioned and used names as commemorations of historical incidents rather than of persons. The oak tree mentioned in Genesis 35 is called by the Hebrew "Oak of Weeping," not "Deborah's Oak," which may be taken as an example of "the flight from personality" in Hebrew naming. We may point out, however, that the Hebrew apparently conceived there to be a very close connection between a person's name and his power or presence. To pronounce a person's name—whether divine or human—was to invoke his power or presence. This has a bearing on what Stewart calls "the flight from personality" in Hebrew naming and it brings to the front the word-magic operative in ancient Hebrew life and literature. (WES)

SLIGHT CORRECTION. The trade magazine *Advertising Age* reprints this "correction" ad from a Chicago newspaper as "undoubtedly the correction to end all corrections." It reads:

"Recently we advertised lots for sale in California City, California. We indicated this property is 'In Greater Los Angeles'; 'Commuting Distance Los Angeles'; 'Already a Large Community'; 'Parks, Schools, Churches Provided For'; 'Running Water, Paved Streets Already In.' An illustrated lake was captioned, 'Isabella Lake near California City.'

"The development is located 115 miles from Los Angeles; 40 homes have been completed. Parks, schools, churches have not been provided for. Land has been dedicated for such use. Water and paved streets are not already in this tract. They are guaranteed as provided by California law. The lake illustration should not have been used since we have been informed the only mapped lake in California named 'Isabella Lake' is not 'near California City.'

"We regret these errors and pledge they will not occur again."

"SPUTNIK" is the title of Georg Kandler's article in the young but very significant journal, *Sprachforum: Zeitschrift fuer angewandte Sprachwissenschaft* (Bonn), Vol. 3 (1958), No. 1. "Zur

Geschichte einer Wortung," Kandler's subtitle, indicates that we have here in the beginning of the writing of the life history of a word or set of words. He discusses the place and use of "Sputnik" in Russian, some associated American terms, such as "Explorer" and "Vanguard," the international scientific names for satellites (e.g., 1957δ), the grammar involved in the use of "sputnik"-words, and the rise of associated terms, such as "U.S.-Sputnik," "Super-Sputnik," "Sputnik-dog," "Sputnik-tennis," "Sputnik-rocket," "post-Sputnik-politics," etc. Kandler's essay and the others which are sure to follow give us the opportunity to trace the history of an important terminology from its beginnings. A few comments are made on the completely spontaneous popularity of "Sputnik" and on its status as a propaganda factor. (WES)

"IN TOWN THE OTHER DAY," writes Guy Wright in the *San Francisco News*, June 18, "was Richard Carlson, the actor who played Herbert Philbrick, a real-life undercover agent, in *I Led Three Lives*. 'The effect of that (television) series was phenomenal,' Carlson said. 'Patriotic societies used to phone me, wanting to give me awards for "your great fight against communism." I always told them it would make more sense to give their medals to the real Herb Philbrick, and offered to put them in touch with him. But this left them confused and disappointed. Although they vaguely realized I was an actor, they couldn't quite believe that I didn't really do all those things they saw on television.' "

Mr. Wright reports another instance of this kind of confusion a few days later (June 23): "Soap opera actress Nina Reader is nursing a busted lip, a present from a woman who slugged her on a Manhattan street, screaming, 'You've got to learn to respect Vanessa!' Vanessa is the name of Miss Reader's mother in the serial *Love of Life*."

DAM CONFUSION ENDS. From the San Francisco *News-Call Bulletin*: "WASHINGTON: President Eisenhower has signed the bill of Sen. Barry Goldwater (R., Ariz.) to keep anyone from thinking Roosevelt Dam in Arizona was named for FDR. It now is Theodore Roosevelt Dam."

A GENERAL SEMANTICS exposition, a sort of semantically-oriented rummage sale, was held by the New York Society for General Semantics, together with the Humanists, the Alfred Dixon Speech Center, and the Anti-Defamation League of B'nai B'rith. Books, periodicals, and other materials were displayed and sold. The Anti-Defamation League brought along a "Rumor Clinic," a slide projection and spoken commentary to demonstrate how rumors develop. Raffles, door prizes, and such lent a holiday air to the festivities.

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SALTY BY STATUTE. "Official precedents for remaking the state verbally were provided by the Florida legislature. When commercial fishermen wanted to catch bass in the fresh waters of Lake Okeechobee the year round but were blocked by the closed season on bass in fresh waters, fresh Okeechobee became salty by statute. The taking of fish with seines on inland waters was illegal. When this became an annoyance to those who wanted to seine Okeechobee mullet, it was decided that since a mullet had a gizzard it could not be a fish." From "Paradise on the Installment Plan" in *The Reporter,* October 15, 1959.

THOMAS HORNSBY FERRIL explodes the clichés about "materialism": "There is one popular convention, however, I will not tolerate —the idea that the world is getting too materialistic and that by some hocus-pocus we must restore spiritual values.

"The plain truth is that we are not materialistic enough. Our inquiry into the materials of life and nature is inadequate. Our mechanical curiosity is sloppy. Of the lofty commencement orators lamenting the rise of materialism, how many can put a washer on the kitchen faucet or check out a bad tube on the TV set? Yet right here, or hitting a log with an axe, begins the beginning of spiritual compensation." (*Rocky Mountain Herald,* May 23, 1959)

IMPACT

QUARTERLY REVIEW OF THE UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION

The discovery of nuclear energy and the widespread interest in its application for peaceful use inaugurates a period of scientific revolution far more important than the discovery of steam or combustion. Our society is being more and more transformed under the influence of this scientific revolution. It is the aim of *Impact* to present original studies and articles on the effect of the new scientific developments on our changing society. The contributors—who in the past have included Alexander King, Jean Coursagel, Pierre Auger, Magens Westergaard, J. W. E. H. Sholto Douglas, William E. Dick, Olof Kinberg, Ashley Montague, Eugene Rabinovitch—deal with every aspect of science in our life, from popularization of science to the challenge of the spaceship, from scientific crime detection to local energy sources, from soilless cultivation to the social and scientific role of modern medicine.

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Friday through Thursday, July 29 to August 4, 1960

Members of the International Society for General Semantics, the Institute of General Semantics, and all other interested persons are invited to attend.

SHUNZO SAKAMAKI
Professor of History and Dean of the Summer Session, University of Hawaii

ELIZABETH CARR
President, Honolulu Chapter, International Society for General Semantics; Professor of Speech, University of Hawaii

PROGRAM COMMITTEE: S. I. Hayakawa, San Francisco State College, *Chairman;* J. Talbot Winchell, South Pasadena, California; Austin Faricy, University of Hawaii. PUBLICITY AND ARRANGEMENTS COMMITTEE: Mr. and Mrs. Charles L. Schafer, Corte Madera, California, *Chairmen.* EXECUTIVE SECRETARY OF THE CONFERENCE: Elizabeth Carr.

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